ELECTRICAL WEST

August 1951
25 Cents

Operating in a War Economy, Page 65
Appliances, Page 89

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

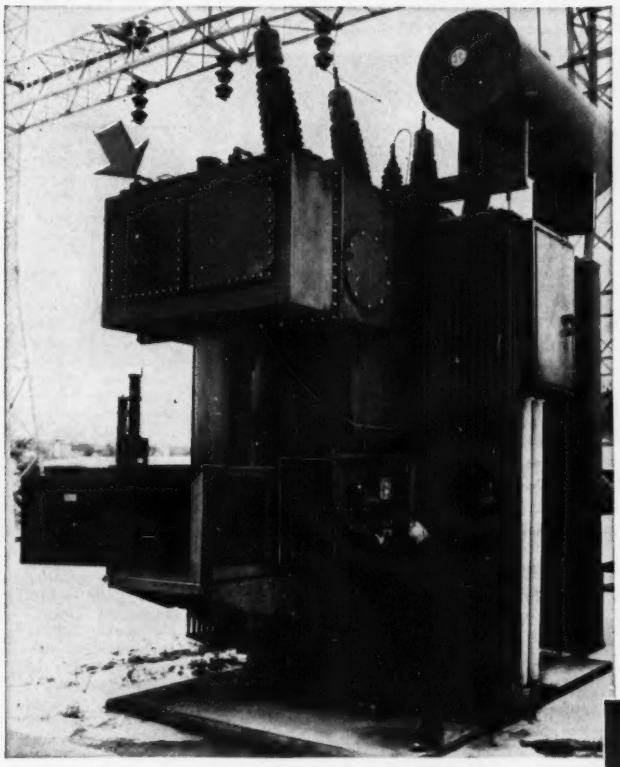
FREEZIN' ASSETS!

The old phrase "frozen assets" is fast losing its unfavorable connotation. Since the increasing popularity of the electric home food freezer, millions of homemakers have learned that certain types of frozen assets are highly desirable. They pay off in better meals, better shopping and better living. Small wonder that thousands more are joining the ranks each year!

Aided and abetted by advertisements like the ones shown here, electrical appliance dealers are profiting, too—especially in Central and Southern California, where "Edison tells them and the dealer sells them!" has been an effective formula for more than half a century.

Get an electric home food freezer now...
and shop when you like!
SOUTHERN CALIFORNIA EDISON COMPANY
Get an electric home food freezer now...
and have less cleaning up to do!
SOUTHERN CALIFORNIA EDISON COMPANY
Get an electric home food freezer now...
and save money on food!
SOUTHERN CALIFORNIA EDISON COMPANY
Get an electric home food freezer now...
and cook when you please!
SOUTHERN CALIFORNIA EDISON COMPANY

Edison **SOUTHERN CALIFORNIA EDISON COMPANY**



At its current rate of operation the load-ratio-control equipment on this G-E transformer at Lewiston, Maine, will require no servicing until about 1962.

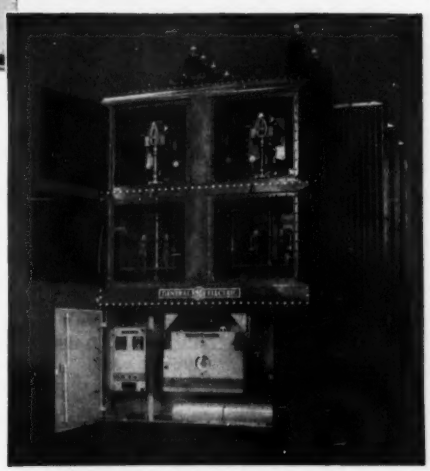
106,554 tap changes since 1947

Arcing tips inspected, found good for 400,000 more operations

Central Maine Power Company recently inspected the load-ratio-control equipment on this transformer rated 13,333 kva (with fans), 115,000Y to 12,000-volts. This was the first opportunity the company had to inspect contacts since installation in 1947. The counter read 106,554 tap changes under load. Here are pertinent parts of the report:

> *"Arcing tips are in good condition, and should last 500,000 tap changes as estimated in the G-E Instruction Book. All bearings, pins, cam rollers and cam surfaces are in excellent condition and show no wear. Oil was slightly carbonized and insulating rods and panel showed some carbon streamers, but there were no carbon deposits in the areas protected by electrostatic shielding. Oil was filtered and re-used. Surfaces were cleaned."*

This report is typical. *At its present rate of operation, this equipment will not require further servicing for about 11 more years.* General Electric has now installed load-ratio-control equipment on 37,665,618 kva of transformers—and the reliability record matches the outstanding record of the transformers themselves. *General Electric Company, Schenectady 5, New York.*



On more recent G-E transformers the contactor compartment is below the one for tap selectors instead of in front of it, to further improve accessibility. The motor drive has also been made more accessible and all controls have been grouped on a hinged panel for operating convenience. Basic design, however, remains unchanged, including electrostatic shielding that prevents dangerous carbon deposits.

401-20

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

AUGUST 1951

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-third year of publication

VOL. 107 NO. 2

ELECTRICAL WEST

George C. Tenney, Editor
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Peggy Boyer, Assistant Editor — John Cootz, Typography

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Cover: Irrigation pumping is one of the most important farm uses of electricity in the West. This installation, one of many on the Pacific Gas and Electric Co. system, is typical of rural loads served by Western utilities.

Next Month

September is our special lighting issue. One of several feature articles will tell how Portland General Electric Co. sells better school lighting in small communities using demonstration techniques developed for selling street lighting. Other articles will discuss methods of checking school lighting, and results of the newer daylighted type of school.

In the field of home lighting, there will be an article on lighting of a model home. As customary, the West has been combed for pictures of good lighting practice and data on jobs of the past year. Several pages of these pictures will appear.

In engineering there will be an article giving fundamental thinking on simplifying modern steam plant design — another piece by Lloyd Hunt. Series compensation of lines to increase transmission distances is important to the West. There will be an article on the installation made by Bonneville, with results to date.

We are unable to have the steam plant subsidence article promised for the past two issues—sorry. Use of a portable concrete mixing plant for tower footings and installation of a 60-kv load interrupter switch to solve an operating problem are good operating ideas.

Among reports, the AIEE convention at Portland in August will be covered.

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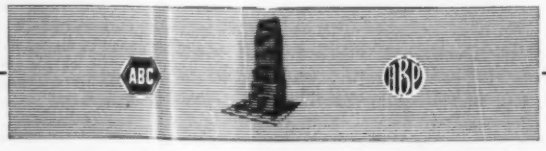

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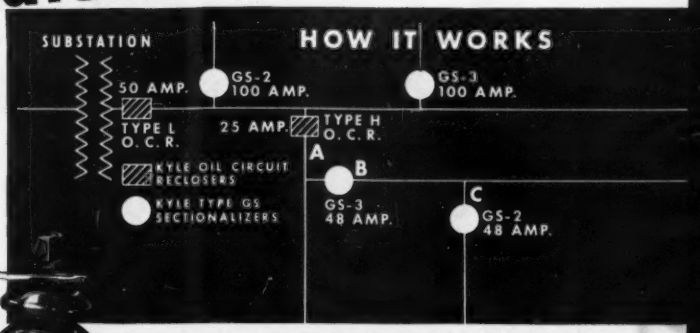
How to make rural line protection fully automatic...

KYLE

type GS automatic oil sectionalizers



Completely automatic from substation to branch

Sectionalizers coordinate with reclosers to isolate branch lines on permanent faults. They are not current-interrupting devices. They open only while the recloser contacts are open. They are pre-set to lock out after the first, second, or third operation of the recloser.

In the diagram, A is the recloser. B is a Kyle sectionalizer set to open during the *third* operation of the recloser (indicated by GS-3). C is set to open after the *second* operation of the recloser. If a fault occurs beyond C, recloser A operates. If the fault doesn't clear on the first operation, the recloser opens again, and Sectionalizer C opens, isolating the tap. Then the recloser re-energizes the rest of the branch.

If a fault occurs *between* B and C, Sectionalizer C does not operate. But if the fault has not cleared by the third operation of the recloser, Sectionalizer B opens, isolating that branch. The recloser then re-energizes the rest of the line.

Other branches are also protected by Kyle sectionalizers which are opened by the 50-amp type L recloser at the substation.

ALL THE KYLE SAFETY FEATURES

Tank, cover, and operating handle electrically dead. Tank may be grounded. Mechanism cooled, and insulated from tank, by transformer oil. Trip-free operating handle—cannot impart a blow to operator.

RATINGS

Seven sizes, with minimum tripping currents 8 to 100 amps to coordinate with reclosers rated from 3 to 100 amps. Maximum operating currents 150 to 2000 amps, 2.4 to 15 kv. Weight with oil about 25 pounds. Crossarm or direct pole mounting.

ISOLATES permanent faults on branch lines...

COORDINATES with any make or type of recloser...

COSTS LESS to operate than fuses...

The Kyle type GS sectionalizer opens only on permanent faults that the recloser cannot clear; it provides completely automatic protection and positive coordination by eliminating the human element in installing the correct fuse; and while the GS costs more than a single-shot cutout, it saves far more than the difference, in time and service calls.

Because sectionalizers do not interrupt current, there is no arc to wear contacts or cause oil contamination. Sectionalizers cannot be used independently, but only with reclosers—of *any* make or type.

Ratings are changed in the field by replacing the trip coil. Lockouts are pre-set by changing the lockout adjustment pin—a matter of a few minutes. After a permanent fault has been corrected, the sectionalizer is manually reset with the operating handle.

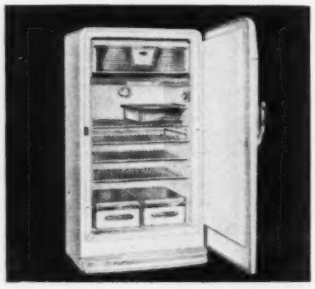
Get the Whole Story

Ask the L-M Field Engineer to explain complete, automatic protection, and to give you a copy of Sectionalizer Bulletin CR3. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL... Kyle Sectionalizers

Electricity has revolutionized farm living!

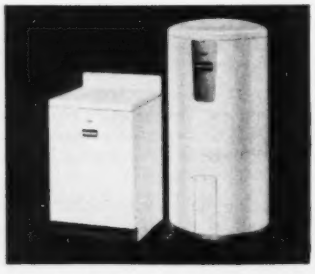
Sixteen short years ago, only one farm family in seven had electricity. At the end of this year, electricity will be available to 95% of the nation's farms —and the output of goods per man-hour on the farm has soared to 156% of the 1935-39 average. Frigidaire salutes this amazing achievement *in bringing the electrical way of life to more people.* For electricity refrigerates, cooks, washes clothes and dishes, heats water, irons, cleans, pumps water, milks cows, grinds feed, lights the house and farmyard — does hundreds of farm chores, and is a servant in the home . . . all at the flip of a switch!



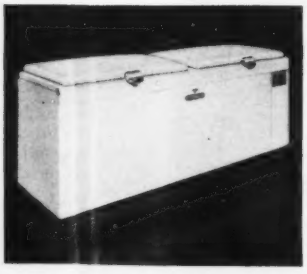
Refrigerators are no longer a luxury, but a real necessity for farm families. They not only save time and effort, but provide the family with necessities—help make extra money on cream, eggs, milk, poultry, butter and other produce.

Electric Ranges equipped with automatic controls, free rural home makers for other tasks instead of keeping them chained to hot stoves. And they're economical for all families, because electricity is the cheapest servant known.

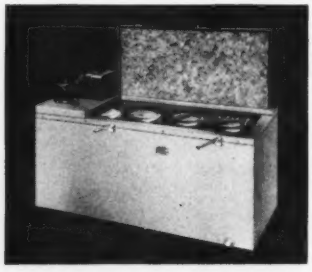
Automatic Washers take most of the work out of washing clothes. Save time too, because many clothes can be ironed without line drying. Even *with* drying, they save time and labor, because damp-dried clothes weigh less and dry faster.



Electric Water Heaters provide running hot water where and when you want it—automatically, and at low cost. In addition to the home, an electric water heater is a wise investment for the dairy man—saves time and work.



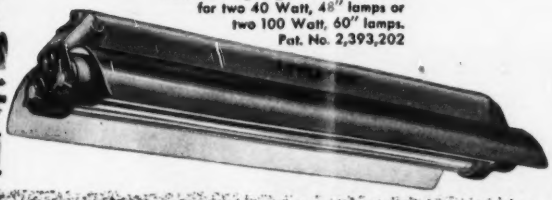
Food Freezers save trips to town, store garden surplus, help add variety to meals. And freezing foods costs less, takes less time and labor, and yields better results than canning. Farm meat and poultry can be frozen and eaten over many months.



Electric Milk Coolers can mean cash savings of hundreds of dollars a year to the dairy farmer, because they keep milk sweet and bacteria count low. They prevent waste, and bring a better price for a better grade product.

Frigidaire Appliances for the Farm Home

Type EFU—First and still finest Explosion-Proof Fluorescent Lighting Fixture. Available for two 40 Watt, 48" lamps or two 100 Watt, 60" lamps. Pat. No. 2,393,202



Industrialite High Mounting Fixture—For railroad yards, steel mills, round houses—any industrial plant calling for a ruggedly built, high-mounted lighting fixture.

BETTER LIGHT *for* BIGGER PRODUCTION

RLM Standard Dome Fixture—Reflector made of rust-resisting iron and finished with three coats of baked porcelain enamel. Sectionalized construction permits easy installation, convenient servicing.

Stocklite—Provides perfect illumination for shelves and bins in stock rooms.

Fewer rejections . . . greater safety . . . better employee relations . . . increased efficiency to meet defense demands—these are the immediate returns on an investment in good industrial lighting.

Appleton Industrial Lighting Equipment is precision-designed to provide *good light*—the right light, without uncomfortable glare, troublesome contrast or shadow. Expert engineering, unequalled manufacturing facilities and nearly a half century of experience are combined in each Appleton fixture to provide maximum efficiency at minimum installation, service and operating expense.

Appleton Lighting Fixtures are made to suit every industrial requirement—including hazardous locations—whether indoors or out. For the finest illuminating equipment or expert assistance on any lighting problem, contact Appleton—Standard for Better Lighting.

APPLETON INDUSTRIAL LIGHTING

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1709 Wellington Avenue • Chicago 13, Illinois

LOS ANGELES 12, 100 N. Santa Fe Avenue

SEATTLE 9, 115 Ray Street

SAN FRANCISCO 1, 655 Minna Street

DENVER 2, 1921 Blake Street

MALLEABLE IRON CONDUIT FITTINGS

APPLETON

OUTLET BOXES AND SWITCH BOXES

ELECTRIC

INDUSTRIAL LIGHTING EQUIPMENT

PRODUCTS

EXPLOSION-PROOF LIGHTING FIXTURES

HERE'S PROOF

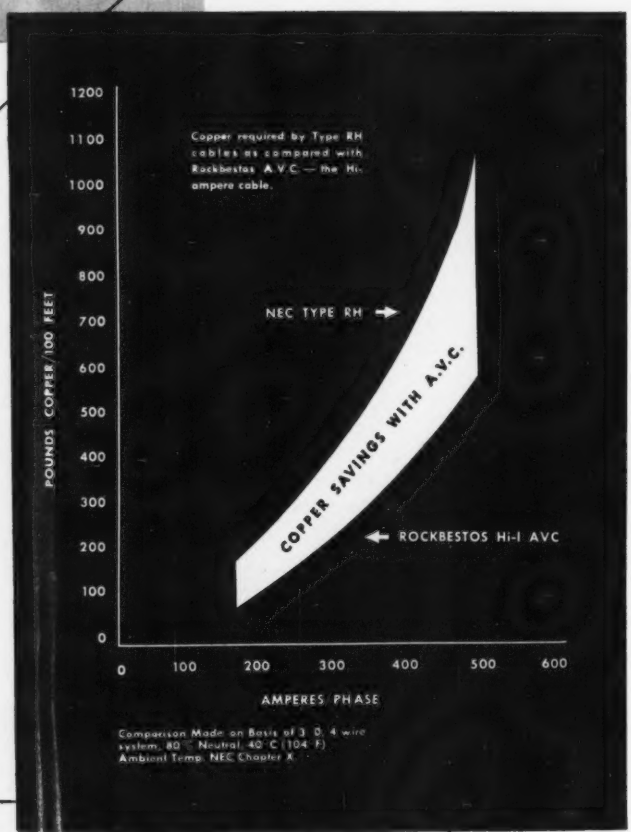
1 lb. of copper will do the work of 1.6 lbs. when you use

Hi $I = \frac{E}{R}$

Your best buy

ROCKBESTOS A.V.C.®

(CODE TYPE AVA)



Size for size Rockbestos A. V. C. carries more current than ordinary cables. And that's why it makes your critical copper and steel go farther.

You always use a smaller cable with Rockbestos A.V.C. Smaller cable requires less copper and smaller conduits and fittings on your power circuits. You save copper — save steel — save time and money.

Where voltage drop and power losses are critical, proper engineering allowances should be made.

Call your Rockbestos Application Engineer *today*. Ask for a copy of "Rx for a Building with Hardening of the Arteries."

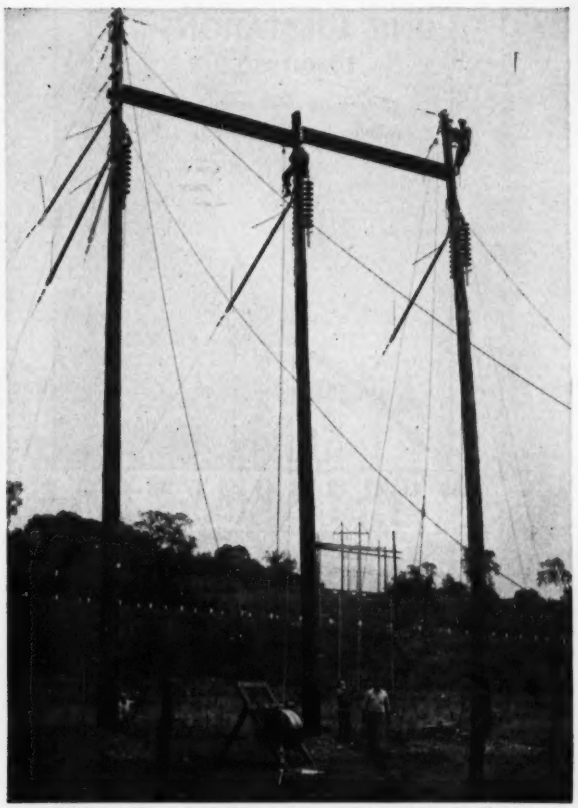
ROCKBESTOS PRODUCTS CORPORATION

NEW HAVEN 4, CONNECTICUT

NEW YORK ST. LOUIS CLEVELAND LOS ANGELES DETROIT OAKLAND, CALIF CHICAGO PITTSBURGH NEW ORLEANS

VITAL LINK

in N. Y. State Electric & Gas Corp. Interconnected Transmission System



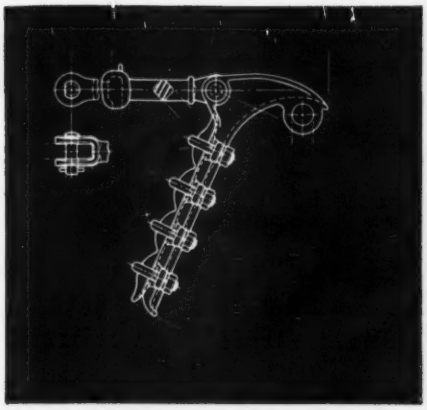
• BTC Drop Forged Aluminum Suspension and Strain Clamps were used on this 3-pole angle deadend structure, shown here in the process of construction.

Why not specify BTC Drop Forged Clamps and Fittings for your own transmission lines. Sold only through your insulator manufacturer.

Drop Forged BTC Hi-Line Hardware

The BREWER-TITCHENER Corporation

Cortland • New York



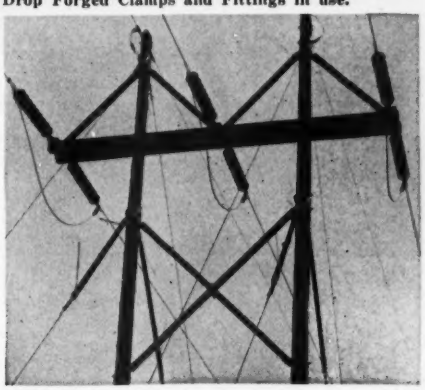
This high-capacity line plays an important role in New York State Electric and Gas Corporation's 114 kv. interconnected transmission system. Thirty-two miles long, it ties two steam generating stations into a system serving a wide portion of southern New York.

The line, which was erected in 1950, employs a 477,000 cm. A.C.S.R. conductor, the largest in diameter and the heaviest in weight per foot of any in the company's system. Special rigging and equipment were required to string the line and pull it to its proper sag. Overhead ground wires consist of ⅜" EHS Copperweld.

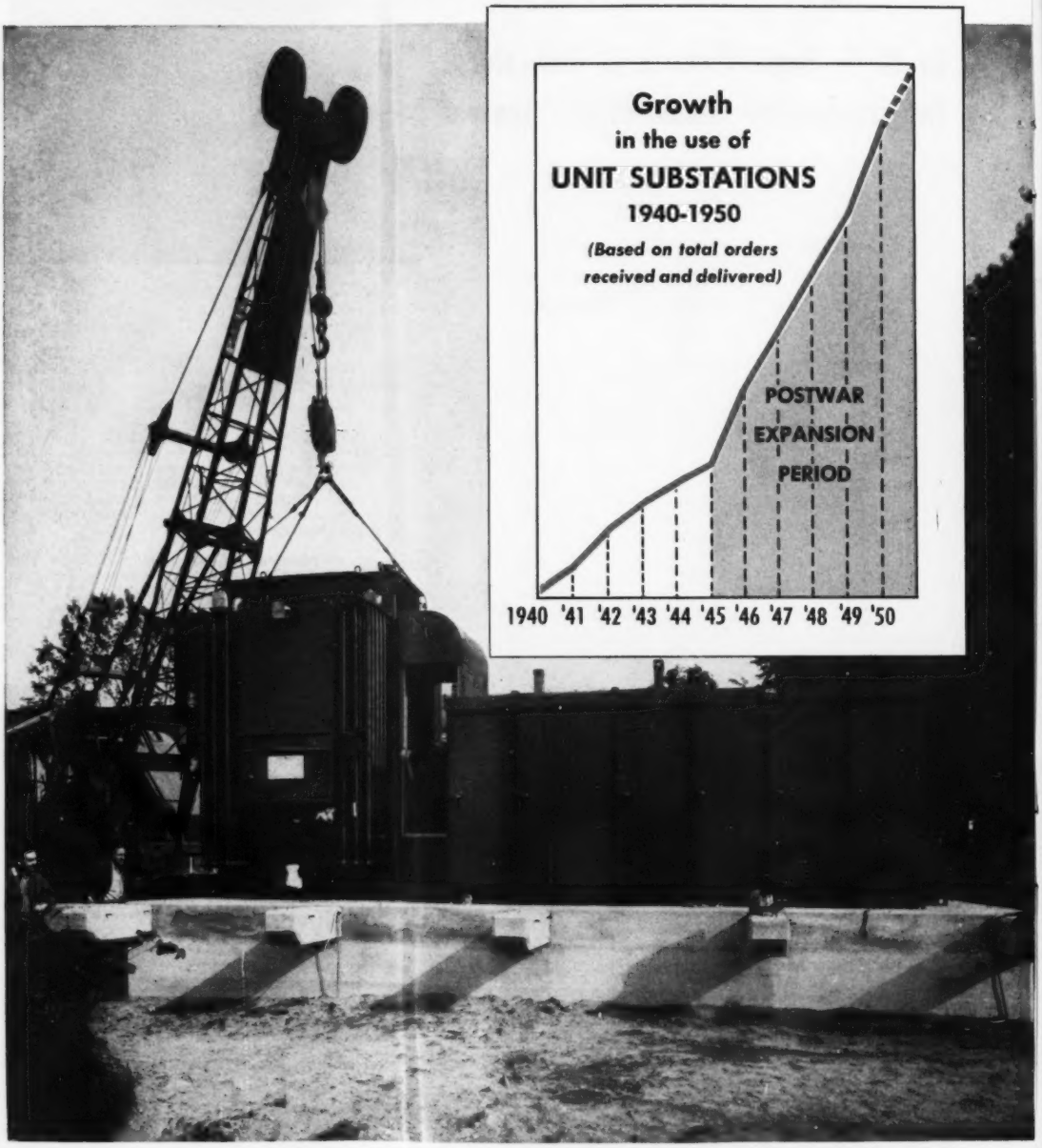
During construction of the line, a highway was raised near one 70 ft. tower. As a result, the tower had to be elevated 20 ft. to obtain standard ground clearance. This was done, without dismantling, with the aid of two portable derricks. While the tower was suspended in the air, a 20 ft. steel extension was assembled underneath — the entire operation taking slightly less than two hours.

This was one of the first N. Y. State Electric and Gas lines to use Aluminum Suspension and Strain Clamps. The BTC Drop Forged Aluminum M.P.L. (Minimum Power Loss) Clamps — plus other BTC insulator hardware — were selected on the basis of their easy installation and efficient, trouble-free performance. They are helping to keep maintenance at a minimum on this vital link in the company's interconnected transmission system.

• This tangent deadend structure, part of New York State Electric and Gas Corporation's interconnected transmission system, illustrates BTC Drop Forged Clamps and Fittings in use.

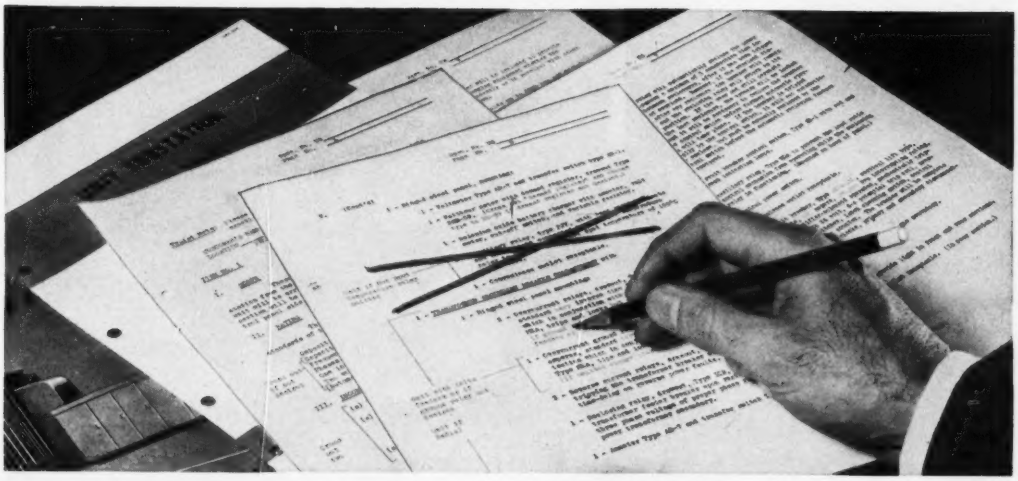


Unit Substations—Key to



QUICK INSTALLATION: G-E unit substations come to you complete—ready for operation. You merely build the foundations, position the equipment and connect to your incoming and outgoing lines. Photo shows G-E unit substation being installed on the system of the Western Massachusetts Electric Co.

Fast, Low-cost Expansion



WEEKS SAVED IN ORDERING! Basic guide-form specifications for G-E unit substations are available to you, and using these, you merely add ratings and number of circuits required and cross out details not applicable. Weeks are saved in detailing layouts and piecemeal ordering. Your engineers have more time for other system work.

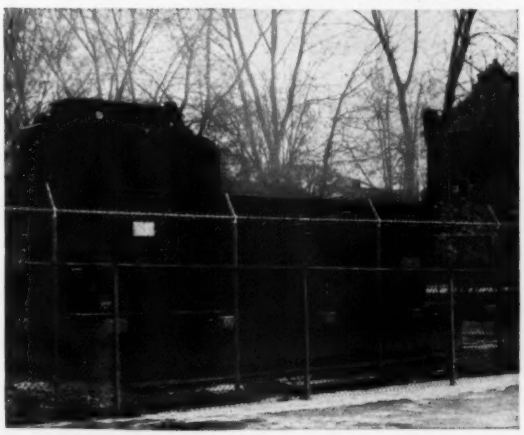
Simplified purchasing, ease of installation help in meeting fast-growing loads . . .

The rapid trend to factory-assembled unit substations—as shown in the chart at the left—seems sure to accelerate even more tomorrow.

Faced with the fastest-growing loads in history, utilities are finding these standardized, easy-to-install units one of their most valued tools in meeting expanding power demands quickly and at lowest cost.

Because of their great flexibility, compactness and adaptability, G-E unit substations are applicable to a wide variety of system arrangements. Standard, co-ordinated designs simplify planning and purchasing.

There's less worry about manpower and material problems. And proved, factory-engineered construction assures outstanding dependability. For full information, write for Bulletins GEA-3800 and GEA-4500. *General Electric Co., Schenectady 5, N. Y.*

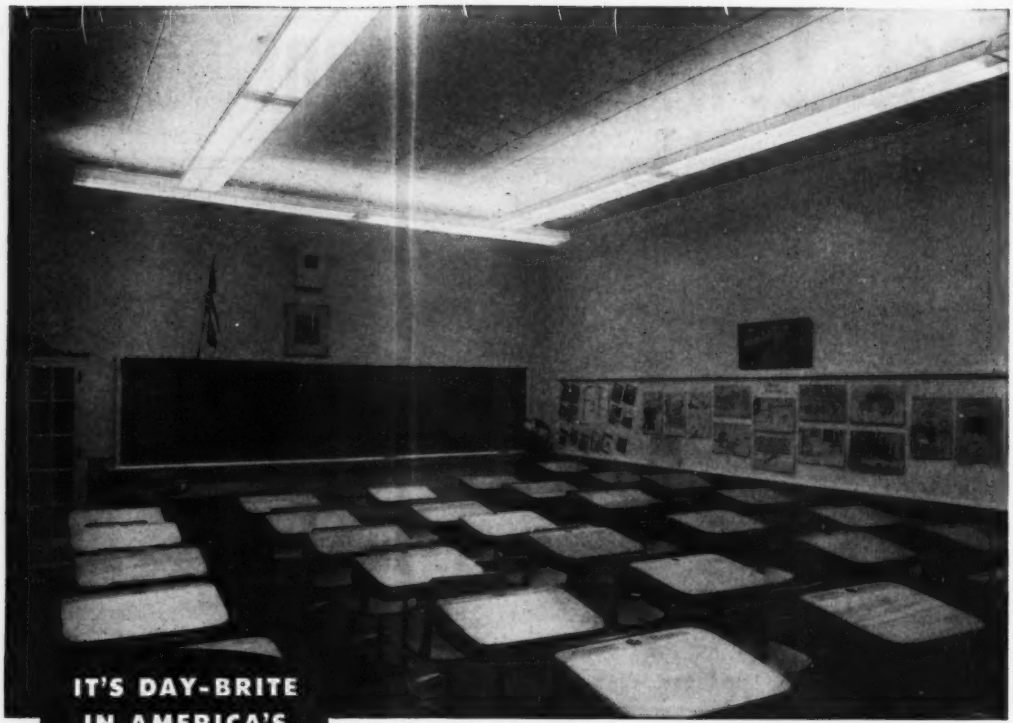


INSTALLED RIGHT AT LOAD: Compact, modern, attractive design of G-E unit substation enables it to be installed close to the load, even in many residential areas. Vital copper for secondary circuits is saved. The substation above was installed by the Western Massachusetts Electric Co. Note church in background.

321-74

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



Anyone Can See Why Children Learn in this School

The North Glendale School in Glendale, Missouri is still another school, one of hundreds throughout America—where Day-Brite supplies modern efficient lighting.

Do teachers in your school look at a group of young *squinting* faces? Do your classrooms have a last row problem? Are your blackboards "glareboards"? Then you should do something about your school lighting now. Glare, bright reflected light, sharp color contrasts or insufficient light can cause permanent damage to strained eyes . . . does result in nervous tension and retarded learning.

Day-Brite has conducted scientific school lighting tests for years. That's why they have been able to solve school lighting problems for teachers, school principals and Public School Systems in literally hundreds of America's schools. That's why Day-Brite fixtures give classrooms the glare-free, evenly distributed light that students need. And, that's why Day-Brite has been able to design quality fixtures with the low-cost installation and maintenance features which most school budgets require. Would you like further information? Write today to Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis, Mo.

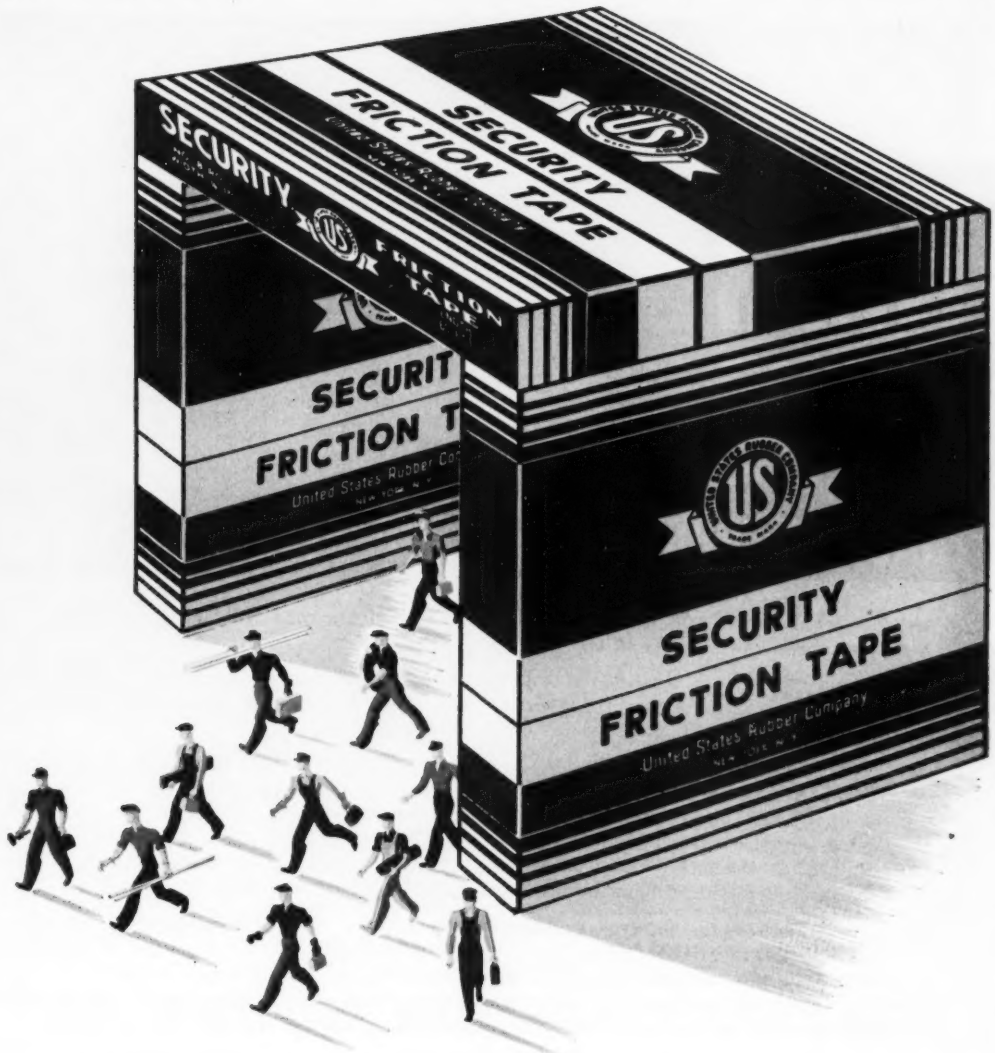
NOW, MORE THAN EVER

AMERICA MUST SEE WHAT IT'S DOING

IT'S EASY TO SEE WHEN IT'S

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

133



Gateway to dependability

No matter what the job . . . you can depend on Security Tape. For electrical and general purpose jobs, Security gives you added protection. Strong, straight-tearing and non-raveling, Security meets the strictest demands. Security has no pinholes to cause leaks, and will not dry out. Ask your wholesaler for Security.

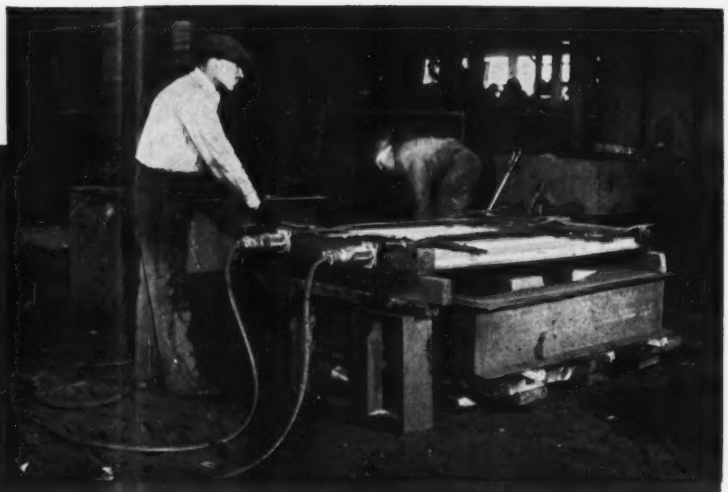
A QUALITY PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

TAPE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

TIREX HELPS TAKE THE BUBBLES OUT OF STEEL CASTINGS



Foundries "skin dry" molds so that the molding sand will not give off a gas and cause bubbles or porosity in the casting.

Until a short time ago it was common practice in most foundries to skin dry molds with an open kerosene torch. It was slow, hot, dirty, disagreeable work and a moment's inattention could result in a burned and spoiled mold.

A Milwaukee foundry decided to get rid of this dirty, slow job of skin drying molds. They had infrared ray heaters developed. These heaters not only did away with the drudgery of the job but gave the foundry several unexpected dividends. First, the labor of the man drying the mold was eliminated. Second, spoiled molds became a thing of the past. But better still, because the infrared ray heaters were faster than the open kerosene torches, it was possible to dry an additional mold each day and that is a considerable dividend.

Of course the infrared ray heaters demanded a dependable pathway for power and that they got in TIREX Cables. This picture shows TIREX Cables connected to the heaters. TIREX not only operates dependably day in and day out but it safely combats the sharp abrasive foundry sand, it eliminates the danger from cable fires caused by flying molten metal sparks, and it takes in its stride the everyday abuse that is part of the job.

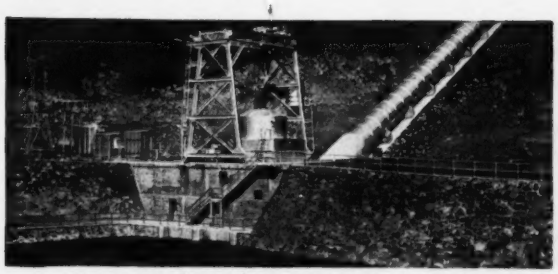
Isn't that the kind of service that you want from your portable cords or cables? Of course it is! This kind of service was deliberately built into TIREX Cords and Cables. They are a product of Simplex research.

Simplex research gave you the first heavy duty, rubber-jacketed portable cord or cable; the first low water absorption insulation; the first rubber-jacketed underground cable. Besides these notable "Firsts" Simplex research has provided a great many developments which have enriched the art of cable design.

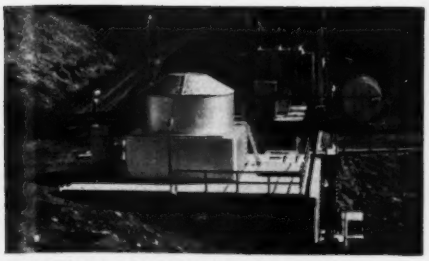
SIMPLEX-TIREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX-TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



UPPER MALAD: One 8400 kva, 85.7% pf, 6900 volt, 225 rpm generator. Also, A-C 12,000 hp, 124 ft head Francis-type turbine, station-service substation, switchgear, main power transformer.



LOWER MALAD: One 15,500 kva, 87% pf, 6900 volt, 200 rpm generator. Also, A-C 22,000 hp, 157 ft head Francis-type turbine.

All generators are modified umbrella type (with upper guide bearings) furnished complete with outdoor housings.

LOWER SALMON: Four 17,500 kva, 86% pf, 13,800 volt, 120 rpm generators — two arranged for variable-pitch propellers. Also, A-C 12,000 kva power transformer.

"OPERATION AND MAINTENANCE ... Very Satisfactory"

THAT's the verdict of Mr. Lester Garlinghouse, plant superintendent of Idaho Power's new Lower Salmon, Upper Malad and Lower Malad stations. It's natural that the six Allis-Chalmers hydraulic-turbine-driven generators in these stations should be highly satisfactory: They are the result of more than 40 years' experience designing and building large generators.

Placed in operation in 1948 and 1949, these generators supply southern Idaho as part of the Northwest power pool. The Malad stations, which are remote-controlled from the Lower Salmon station, operate 24 hours a day, seven days a week. Lower Salmon is used for load factoring (peak load operation) and runs at full load an average of about 10 hours a day every day of the year.

Whatever your power requirements are, you can rely on Allis-Chalmers for efficient, reliable generators custom-engineered for your installation. Types, ratings and construction features are described in new bulletin 05B7549. Contact your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wis.

A-3446

ALLIS-CHALMERS

You can't buy Better Fittings or ones that cost less to use

Cross Section Showing Indentations.

Quicker to use and neater in appearance, Briegel All-Steel Indenter Fittings not only make stronger connections but also make each job more profitable to the contractor and satisfactory to his customers.

Two Easy Squeezes and they're set to stay. It is only natural that the Briegel All-Steel Indenter Fittings are the most widely used E.M.T. connectors and couplings. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job neater, stronger and better.

All B-M Fittings Carry the Underwriters Seal of Approval

BRIEGEL METHOD TOOL CO.

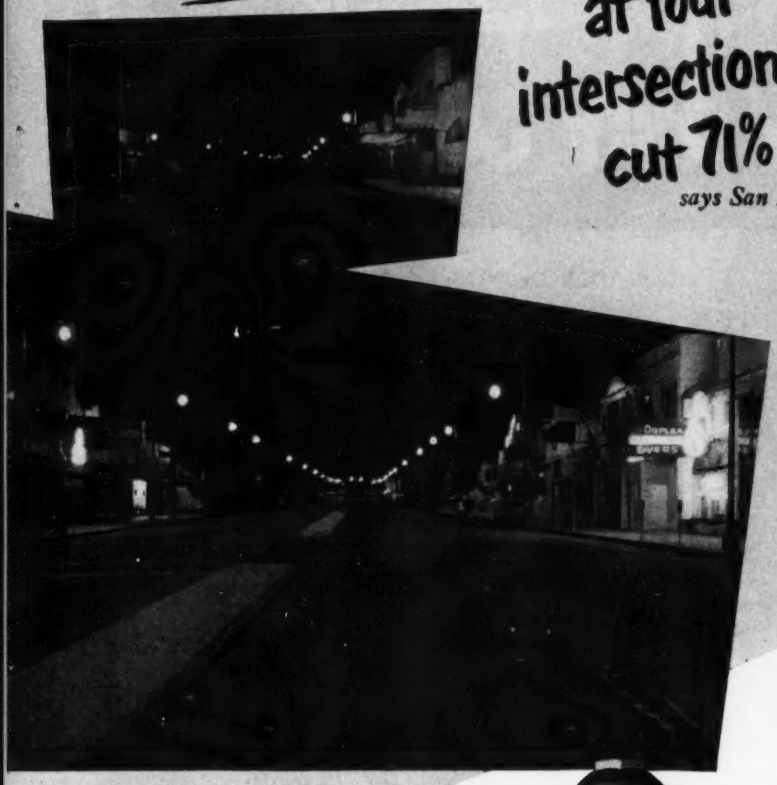
GALVA, • ILLINOIS

DISTRIBUTED BY

The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Wagner Malleable Products Co., Decatur, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; Kondu Mfg. Co. Ltd., Preston, Ont.

"Traffic deaths at four intersections cut 71%"

says San Francisco's Mayor Robinson



"Traffic deaths at four intersections were reduced 71 per cent in one year with modern street lights," says Mayor Elmer G. Robinson. "The year prior to our installation of new lighting at four suburban intersections, there were 32 night deaths. The year following the lighting installation, there were 19. Still too high, but not caused by inadequate lights.

"The people of San Francisco are growing more aware of the great importance of street lighting. Our lighting program today is at an all-time high, and Line Material's Spherolites are doing their part."

•

Aiding Mayor Robinson in this progressive civic program is Mr. B. A. Devine, manager and chief engineer of the San Francisco Bureau of Light, Heat and Power, who worked with L-M Lighting engineers in planning the new lighting, supervised its installation, and is in charge of its operation.

Also cooperating with the city and L-M were engineers of Pacific Gas and Electric Company, who aided in the overall plans for the city's program of improved street lighting.

Complete Lighting Engineering Service. For many years L-M has been outstanding in its extensive staff of lighting engineers, who cooperate with municipalities and power companies in planning street lighting programs that meet the needs of the municipality and the neighborhood.

For full information on this service and on L-M equipment, ask the L-M Field Engineer, or write Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

"Before" and "after" installation of L-M Spherolite luminaires on San Francisco's Geneva avenue. The view is looking east from Mission street. L-M Spherolites with 4000-lumen lamps were set at 135-foot intervals, staggered on opposite sides of the street. Mounting height is 27' 4", on 6-foot brackets.

The famous L-M Spherolite*

Directs a high percentage of the light onto the pavement, spreading the light over a wide area, in a precisely controlled pattern. Variety of heads, reflectors and glassware to meet any requirement. Low maintenance, easy accessibility for service. For details ask for Bulletin SL3.

*Trademark

47

LM®

LINE MATERIAL . . . Street Lighting

L-M ANNOUNCES

a complete line of type PHD

5 KV HEAVY DUTY CUTOUTS

Up to 20,000 amperes interrupting capacity

Interchangeable doors—standard, heavy duty, and switch blade types

50 and 100 ampere doors fit your present PVD® cutouts.

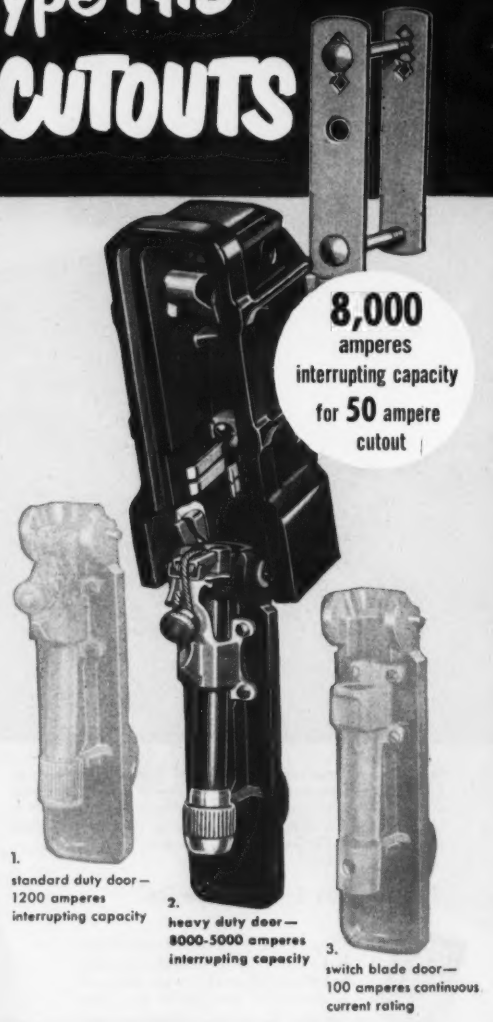
Here is the first and only complete line of cutouts for high power capacity distribution feeders—a complete line of type PHD 5 kv cutouts in 50, 100, and 200 ampere ratings, and with interchangeable doors in each rating.

These cutouts provide high interrupting capacity *as you need it*, without the extra cost for needless high *continuous* current rating. They are guaranteed to operate through the full range of fault currents.

Now you can install one of these new L-M cutouts with standard duty doors. As feeder load requirements change and fault currents increase, just make a heavy duty cutout out of it, by hooking on the heavy duty door. Doors for the 50 and 100 ampere cutouts also fit your *present* PVD's—so you can change those into heavy duty cutouts with these new doors! Switch blade door, either stationary or indicating, converts cutout into a disconnect switch in just 6 seconds. Warehousing and stocking are all greatly simplified!

OUTSTANDING DESIGN FEATURES

- Housings wet-process porcelain, glazed inside and out.
- Hanger supports cemented into back of porcelain housings.
- All current carrying parts silver plated.
- New clamp type terminals with easily accessible large-head screws.
- Replaceable "bakelined" fuse cartridge tubes resist weathering and arcing.
- Spring-actuated flip-out device pulls fuse link down and out of tube, assuring instant separation of link parts, even with the smallest links and low fault currents.



1. standard duty door—1200 amperes interrupting capacity
2. heavy duty door—8000-5000 amperes interrupting capacity
3. switch blade door—100 amperes continuous current rating

L-M HEAVY DUTY CUTOUTS

RATING	DOORS AVAILABLE	INTERRUPTING CAPACITY rms amperes 2.5 kv*	5 kv**
50 AMPERES	1. Standard duty, indicating	1,200 amp.	1,200 amp.
	2. Heavy duty, non-disconnecting	8,000 amp.	5,000 amp.
	3. Switch blade	100 amperes continuous current rating.	
100 AMPERES	4. Standard duty, indicating	3,000 amp.	3,000 amp.
	5. Heavy duty, non-disconnecting	14,000 amp.	10,000 amp.
	6. Switch blade	200 amperes continuous current rating.	
200 AMPERES	7. Heavy duty, indicating	20,000 amp.	15,000 amp.
	8. Switch blade	400 amperes continuous current rating.	

* or line-to-neutral 4160 or 4330 volts Gr. Y. ** or line-to-neutral 8330 volts Gr. Y.

Engineered for Safety

The lineman can remove the door completely, refuse and replace it, all with a switch stick. When door is open, all door parts are dead.

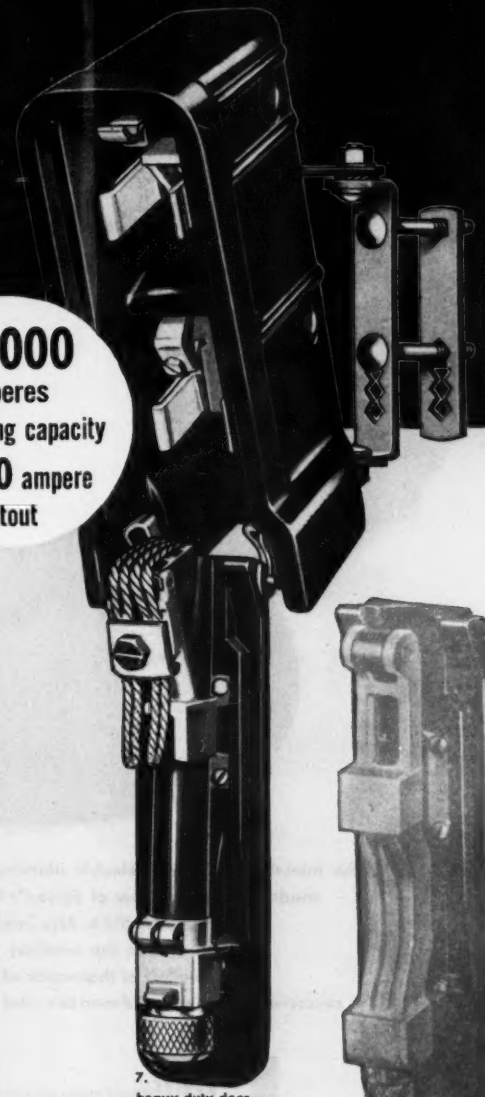
Get the Whole Story

Ask the L-M Field Engineer for complete information and copy of bulletin; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

PHD is a Line Material Trademark

14,000 amperes interrupting capacity for **100** ampere cutout

20,000 amperes interrupting capacity for **200** ampere cutout



4.
standard duty door—
3000 amperes
interrupting capacity

5.
heavy duty door—
14,000-10,000 amperes
interrupting capacity

6.
switch blade door—
200 amperes continuous
current rating

7.
heavy duty door—
20,000-15,000 amperes
interrupting capacity

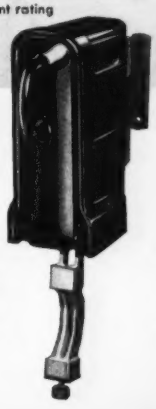
8.
switch blade door—
400 amperes continuous
current rating

LM

LINE MATERIAL

fuse cutouts

Complete Coordinated Equipment for Distribution Today



400 ampere disconnect switch in indicating position

Through the use of this new, higher-rated switch blade, the 200 ampere cutout can now be converted simply and quickly to a 400 ampere disconnecting switch for use on higher nominal current systems. Door can be closed with hinged blade in disconnect position below the box, giving positive indication that the line is open—a unique L-M feature.

The miracles of modern electric illumination were all foreshadowed by the glow of Edison's first lamp—implicit in the great IDEA. Also implied in this, as in all epoch-making inventions, were the corollary imagination and effort of thousands of unpublicized successors—pioneers of America's vital electric illuminating industry.

KERITE insulation was well established before the turn of the century. Already famous in telegraphic and signal applications, Kerite quickly won recognition for safety, dependability, and ultimate economy in the infant lighting and power industry . . . for the transmission of electric power via aerial, underground, and submarine cable.

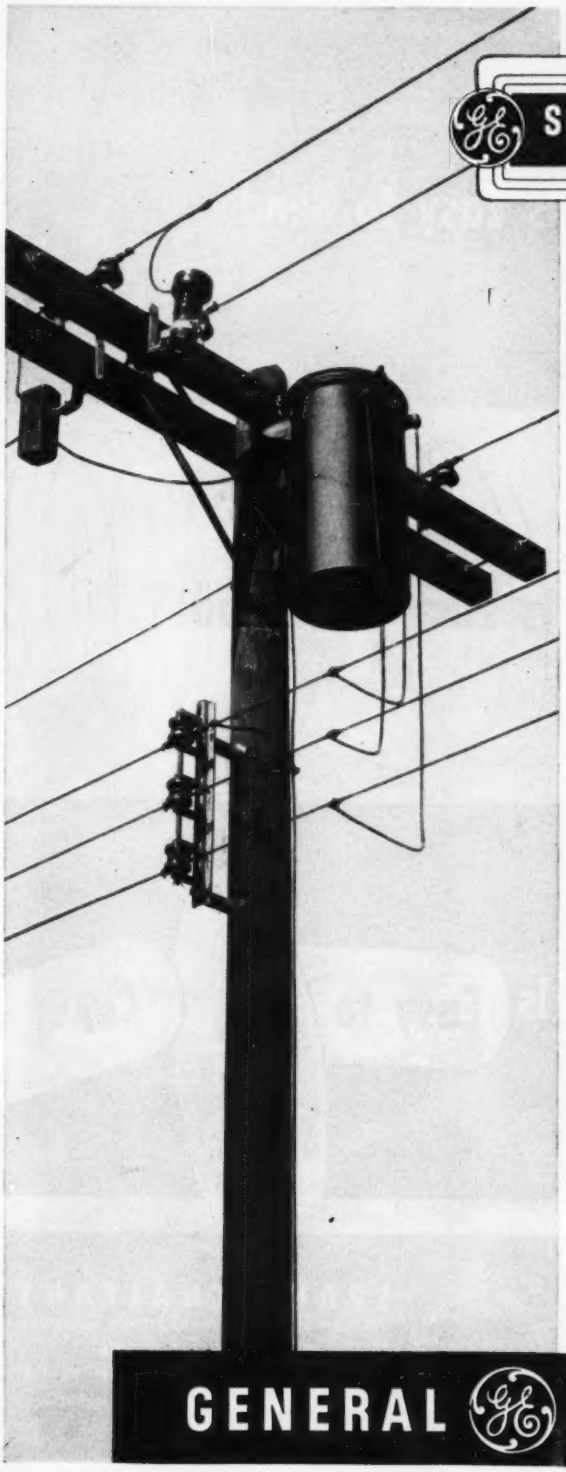
By conscientious workmanship, careful handling, and a continuing search for new and better applications of its unique formula, The Kerite Company has been able to anticipate the power industry's needs. It will continue to apply itself to the technical world of "ideas" in which now, as in Edison's day, the future of America's power still lives.

The Kerite Company, 30 Church St., New York 7, N. Y.
Chicago — San Francisco — Los Angeles

DAYS KERITE

KERITE CABLE

Kerite Insulation—Your Cable's Best Life Insurance



SPIRAKORE TRANSFORMERS

Finish on General Electric Transformers saves one, maybe two, repaintings

San Diego Gas and Electric has been running extensive tests on paint finishes. The Melaglyp paint on General Electric transformers, they say, is superior to any other paint tested. It will save one, maybe two, repaintings.

This is testimony from a company that has in one location almost every condition that is unfavorable to paint: Salt spray. Dry spells during which salt never washes off. Heavy dew. Intense California sunshine.

Melaglyp, a greatly improved paint made with melamine-modified Glyptal* alkyd-resin, has been standard on all G-E Spirakore transformers shipped since 1947. We are confident that you'll find this paint is cutting your maintenance cost.

** Registered trademark of General Electric Company.*

General Electric Company, Schenectady 5, N. Y.

402-110

GENERAL ELECTRIC

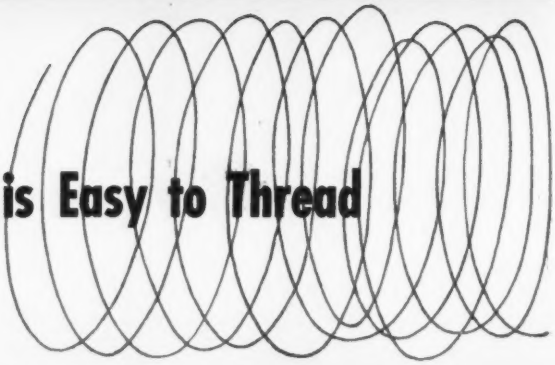
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

SPANG CENTRAL

Conduit is Easy to Bend

SPANG CENTRAL

Conduit is Easy to Thread



SPANG CENTRAL

Conduit is Easy to Cut

Choose the conduit best suited to your job from the Spang-Central Big 4 Conduit family . . . "Cenlaco", hot dipped inside and out . . . "Central White", black enameled inside, electro-galvanized outside . . . "Central Black," black-enameled inside and out, and "Central EMT," lightweight, clear enamel inside, electro-galvanized outside.

The Spang-Central Big 4 are approved by Underwriters' Laboratories and comply with the National Electric Code. Spang-Central rigid or lightweight conduit is sold through prominent, recognized distributors.

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
GRANT BUILDING, PITTSBURGH 30, PA.
District Offices and Sales Representatives in Principal Cities

SQUARE D *Reduced Voltage* STARTERS

One of these 4 types will meet your requirements . . . best

Is minimum motor current inrush your primary consideration?
Is it reduced starting torque? Or maximum smoothness in acceleration?
Is cost an important factor?

With these four types Square D can meet any reduced voltage starter requirement—exactly.

Write **for Reduced Voltage Starter Bulletins. They give complete details.**
Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

CLEAN INSTALLATIONS. Individually mounted or grouped, wye or delta, whatever your standard wiring practice may be, you'll find it easy to design cleaner, safer installations with the new Westinghouse "CSP" Transformers.

Put Yourself ON THE SPOT

Where clearance means SAFETY

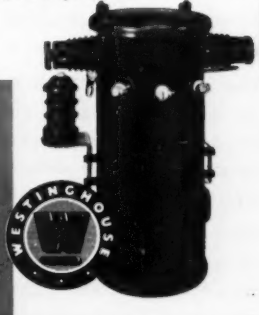
Put yourself in these shoes, high on a pole top where clearance means safety. That's where you'll appreciate the new Westinghouse "CSP"® Transformers with wall-mounted, high-voltage bushings that give you better working clearance—where they eliminate long loops that swing dangerously in the wind.

Try on these gloves, and you'll agree that it's important to have a large insulated knob to make hand-tightening easy, eliminating the need for tools.

Now back to the desk, where statistics talk best. Your own figures* can show you it's good business to standardize on "CSP" Transformers . . . to take advantage of this lower installed cost, better service continuity. Extra features like "Coastal Finish", bushings with unbreakable Enrup† knobs, and Wemco C-I (inhibited) Oil make it pay to specify Westinghouse "CSP" Transformers. J-70588

*If you have not yet made the detailed analysis of initial, installed and maintenance costs of "CSP" Transformers on the basis of *your own figures,* ask your Westinghouse representative for a copy of the check chart, B-4247B, "Transformer Costs and Their Relation to Profits". He'll be glad to give you details on the new product features, too. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

†T. M. Reg. U. S. R. Co.



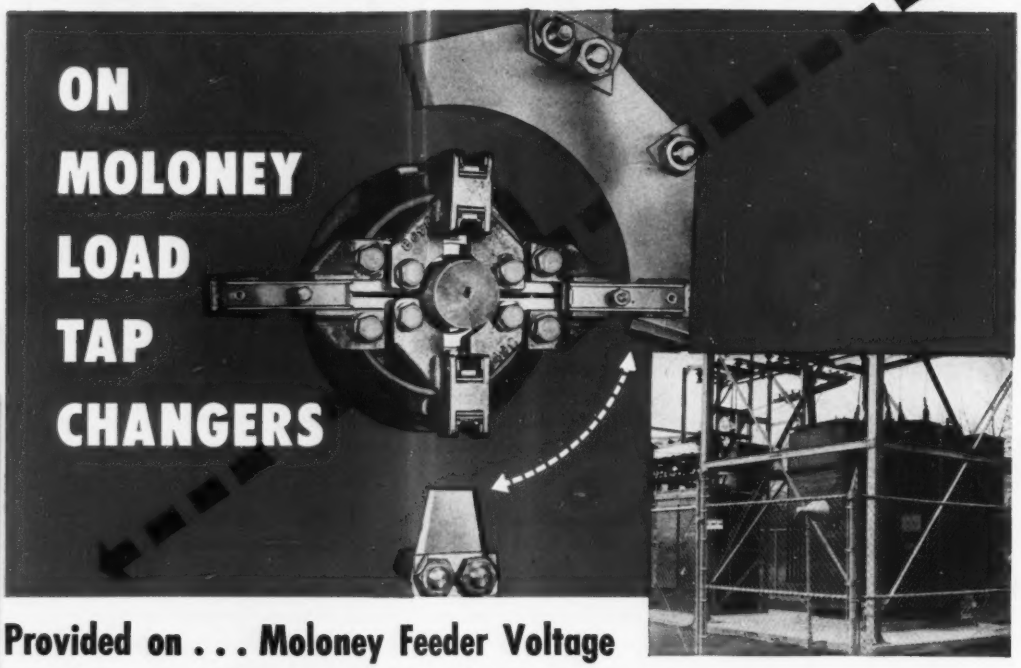
YOU CAN BE SURE... IF IT'S

Westinghouse

"CSP" DISTRIBUTION TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

GREATER ARC CLEARANCE



Provided on . . . Moloney Feeder Voltage Regulators • Regulating Transformers • Load Ratio Control Transformers

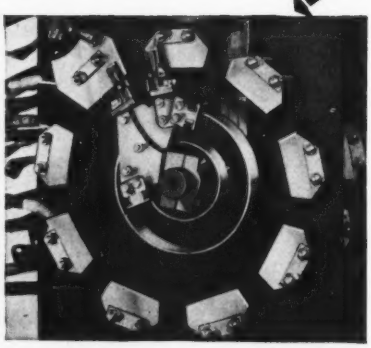
Load Tap Changers, provided on all Moloney Feeder Voltage Regulators, Regulating Transformers and Load Ratio Control Transformers, feature a Load Transfer Switch which relieves the Tap Selector Switch of all arcing duties and results in greatly increased arc interrupting capacity.

Use of the separate Load Transfer Switch permits longer arc clearances to be maintained since arcing duty is confined to but two stationary contacts per phase. This is in contrast to the nine stationary contacts per phase which are subject to arcing on regulators which require the Tap Selector Switch to break the load current.

This feature of the Moloney Load Tap Changer, along with the use of by-pass switching reactors, permits tap changing on a larger Kva load without increasing the physical size of the Load Tap Changing equipment. Maintenance costs are also reduced since arcing is eliminated from the Tap Selector Switch.

MEBI-14

NO ARCING HERE

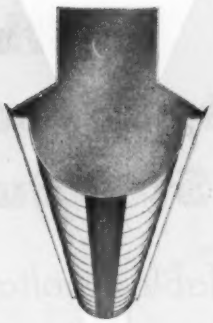


No arcing duty is imposed upon any of the tap selector switch contacts, avoiding the necessity for replacement due to burning or scoring. Contacts are of hardened *copper alloy* to minimize frictional wear.

MOLONEY ELECTRIC COMPANY

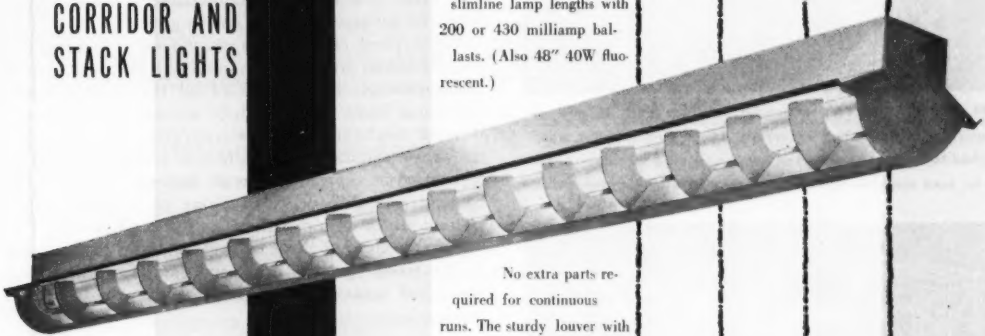
Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA



SUNBEAM'S NEW CORRIDOR AND STACK LIGHTS

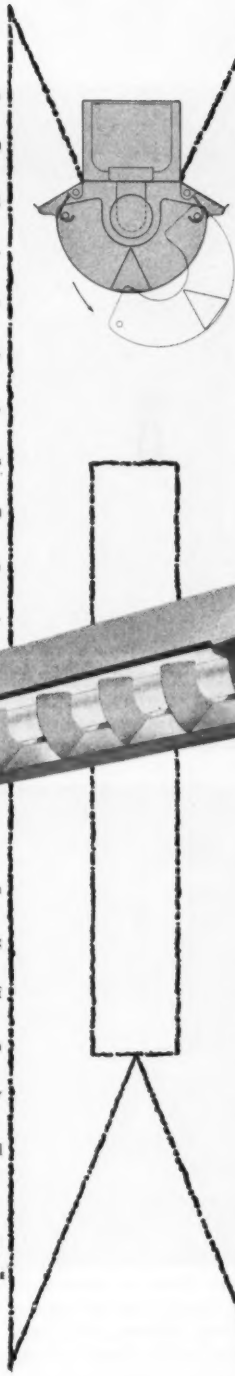
Another advancement in functional lighting, this new Sunbeam visionaire (L330 series) is especially designed to provide efficient lighting in narrow areas. This is the fixture to specify for lighting in corridors and over stairways where visibility for safety counts. This is the unit to install over library stacks, files, stockroom shelves, bins or similar applications where quick identification and readability is important. Simple to install, simple to maintain, the L330 series is available in all slimline lamp lengths with 200 or 430 milliamp ballasts. (Also 48" 40W fluorescent.)



No extra parts required for continuous runs. The sturdy louver with an inverted "V" provides complete shielding from below and is designed to reflect a large portion of the light outwards to walls or shelves. It hinges from either side for easy access to the lamp. 6 9/16" deep, 7" O.A. wide, 300° baked white durogloss enamel finish. Write for complete information.

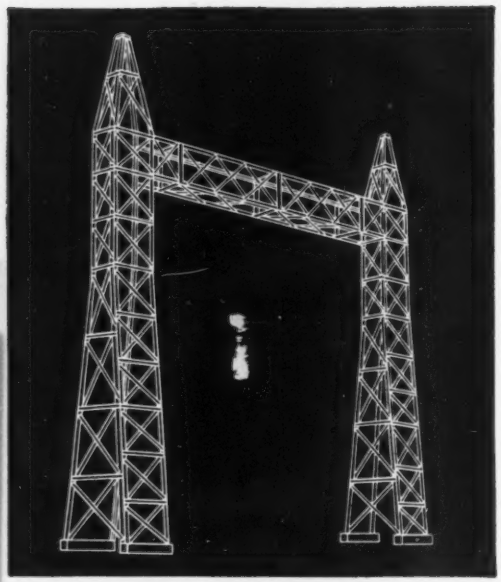
SUNBEAM

LIGHTING CO., 777 E. 14TH PLACE
LOS ANGELES 21, CALIFORNIA



Now.. G-E Outdoor Stations with Standardized Structures

Available in voltage ratings from 7.5 to 230 kv

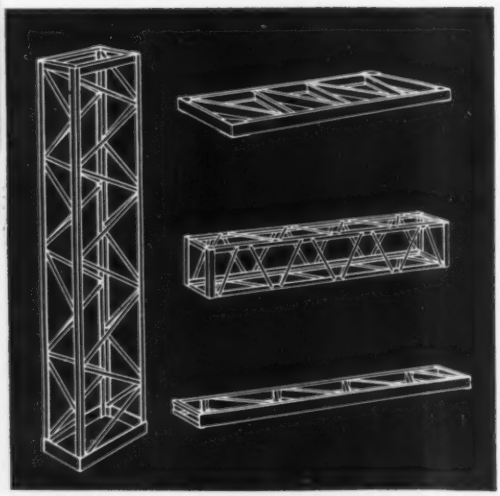


HIGH TOWER—Used for dead-ending incoming lines as well as support for incoming line disconnects. Lower truss supplied when required for support of oil circuit breaker isolating switches. Tower can be used singly or combined to make multi-bay arrangements.

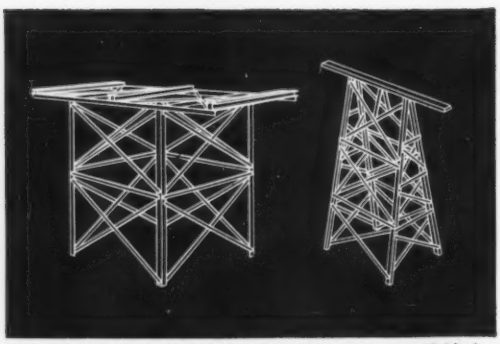
Designed as a result of 35 years of experience in outdoor station construction, G-E standardized steel structures now mean lower installed costs, less time required for station layout and engineering.

The typical components shown on this page can be combined to form an infinite variety of station arrangements. The design of all the electrical and structural items in an outdoor station must be co-ordinated mechanically and electrically if the items are to form a satisfactory installation. Sensible standardization of structural steelwork now makes it all the more practical to order it as one pre-designed component along with the other station equipment.

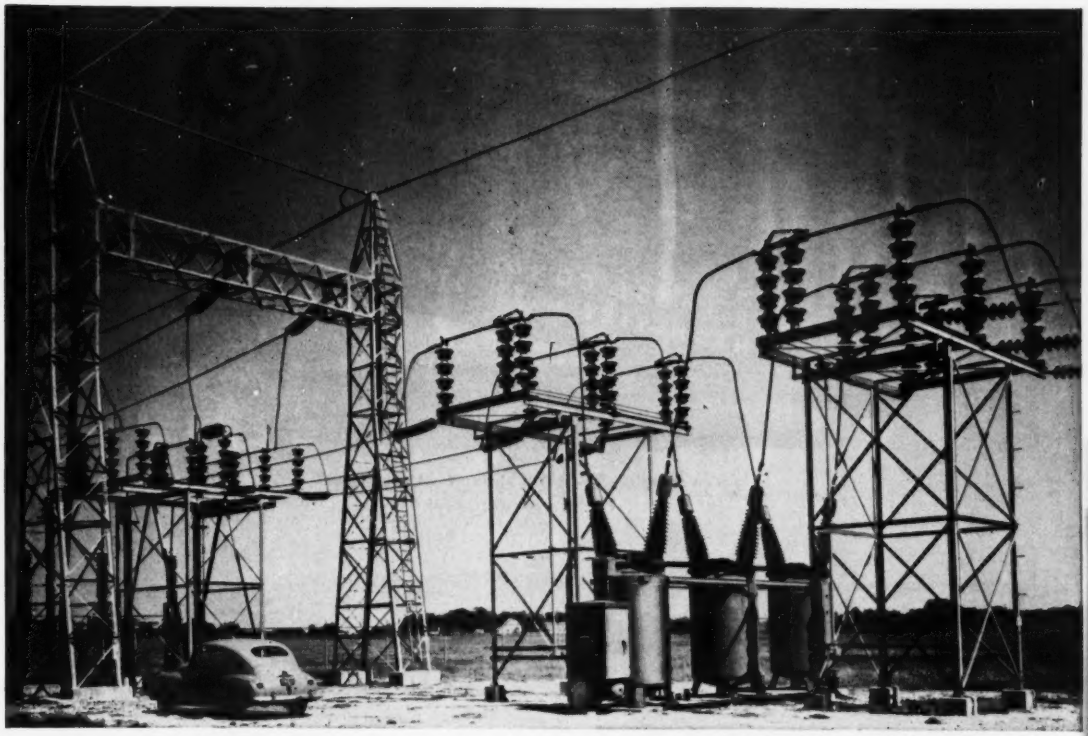
Development of these structures was a logical step in the trend towards increased standardization as a means of achieving maximum savings of time and money.



COLUMNS AND TRUSSES—Square or rectangular columns in lengths of 13'6" through 38'. Together with flat and box-type trusses, they form easily assembled "building blocks" for a wide variety of structures for mounting switches, fuses, lightning arresters, buswork, current transformers and other equipment.



SWITCH AND DEAD-END TOWERS—These towers are available in standardized dimensions to suit various voltage ratings. Design is based on a long experience with similar structures and requirements expressed by a long list of users. Other equipment available includes insulator pedestals and equipment stands.



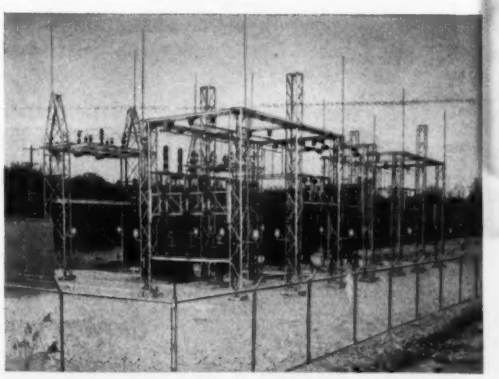
161-KV STATION showing use of standardized switch towers and high tower with one horizontal truss. This station was erected by the St. Joseph Light and Power Co., Marysville, Mo., one of the many users of G-E standardized outdoor stations.

Complete stations in standardized, pre-designed units—adaptable to every type of layout

The two outdoor stations shown here are typical examples of "building block" construction using G-E standardized structures, together with G-E switchgear, transformers and other equipment.

By ordering complete G-E outdoor stations with pre-designed, standardized structures, the tedious job of engineering and detailing separately ordered items is avoided. There is only one specification, one purchase transaction for each station. And with less time lost on detailed structural engineering, personnel can give more attention to the more important work of long range system planning.

For details of G-E standardized structures, write for Bulletin GEA-5573. For other information to help in outdoor station planning, ask for GEA-1040—Power Transformers, GEA-4985, 1642 and 4407—Oil Circuit Breakers, GEA-4980—RF Disconnecting Switches, and GEA-1304—Thyrite Lightning Arresters. *General Electric Co., Schenectady 5, New York.*



CINCINNATI GAS & ELECTRIC CO. MIDWAY STATION constructed entirely of G-E standardized structural units including latticed columns and trusses. Use of these components saved time and expense in designing, and expedited erection.

GENERAL ELECTRIC

853-5

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Nicopress

SPLICING SLEEVES

FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

**Light in weight—Holds full strength of conductor—
High in conductivity**

Completed NICOPRESS Splice on 4/0 Copper Conductor

**Completed NICOPRESS Splice on 3/8" Extra High Strength
Copperweld Strand**

**Completed NICOPRESS Splice on 3/8" Extra High Strength
Galvanized Steel Strand**

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

THE NATIONAL TELEPHONE SUPPLY COMPANY

The National Telephone Supply Company

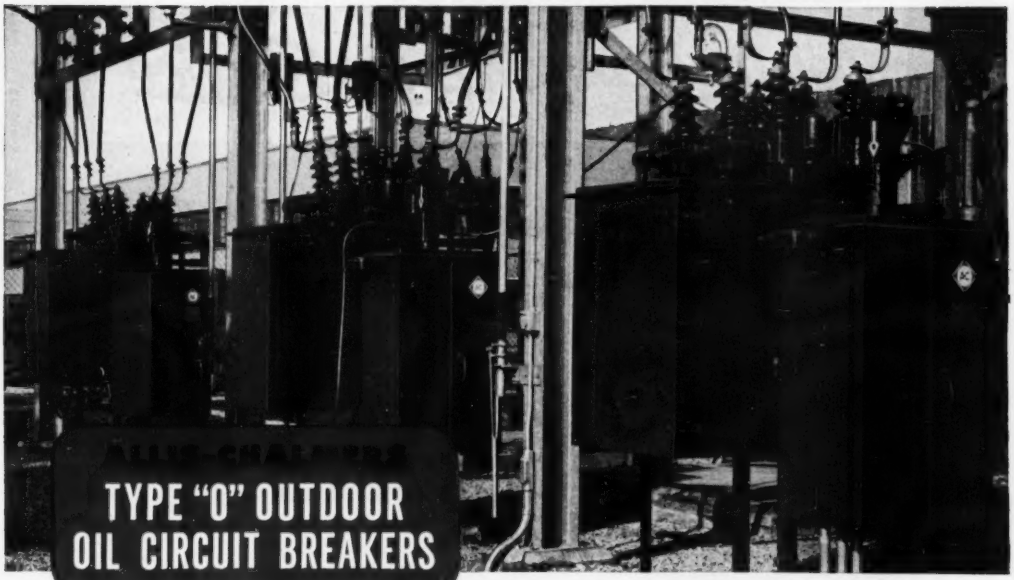
5101 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.: H. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA • Export Distributors: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Dependable

ELECTRICAL PROTECTION

FOR DISTRIBUTION SYSTEMS



Packaged complete for improved automatic reclosing service

ALL YOU NEED to order your type "O" breaker is one set of specifications. It's simple and convenient. This standard 3-pole breaker comes to you mounted on a strong lightweight framework with operating mechanism and automatic reclosing equipment each in its own weatherproof housing. The type "O" breaker is factory assembled, wired and tested in accordance with ASA standards . . . ready to install and operate.

SECURE THESE PROVEN ADVANTAGES

1. **Positive, high speed breaker action with mechanically and electrically trip-free solenoid operating mechanism, ac or dc operation as specified.**
2. **Efficient circuit interruption with high rate of dielectric recovery for low contact and oil deterioration.**
3. **Automatic reclosing duty for unattended stations with standard protective and reclosing relay equipment included.**

Feature for feature you cannot buy better breakers in this class. Over 50 years of Allis-Chalmers progress in power circuit breakers is built into them. You can install them with complete confidence. For more information call your local A-C sales office or write Allis-Chalmers, Milwaukee 1, Wisconsin, for bulletins 71B6165A (OX-18) or 71B6093C (OZ-110, OZ-210).

A-3440

Type	Rated KV	Rated Amps. (60 cycle)	Interrupting Capacity KVA
OX-18	7.2	600	50,000
OZ-110	14.4	600	100,000
OZ-210	14.4	600	250,000
OZ-210	14.4	1200	250,000
OZ-210	23	600	250,000

ALLIS-CHALMERS A-C ALLIS-CHALMERS

Wagner
TRANSFORMERS
...the choice of leaders
in industry

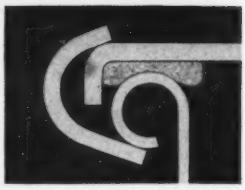
3 REASONS WHY

Wagner
Form W TRANSFORMERS
pay dividends in Extra Service

Wagner maintains 31 branch offices in principal cities for quick, convenient engineering service. Consult the nearest branch on your next transformer installation.

1 SHUR-SEAL COVER

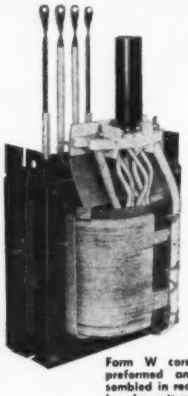
The new method of fastening the cover to the tank that provides true sealed tank construction. "Breathing" is prevented and no leakage of oil can occur. The SHUR-SEAL Clamping Ring maintains equal pressure *all around* the cover —yet permits easy removal of the cover by loosening a *single* stainless steel bolt.



The V-shaped cross section SHUR-SEAL Clamping Ring securely locks the cover to the tank to assure an air-tight seal.

2 IMPROVED CORE AND COIL DESIGN

Form W elements, with preformed cores of cold rolled, oriented grain steel permit the construction of small size, light weight, yet liberally designed transformers. Form W Transformers give excellent electrical performance – core and copper losses are low . . . short time overload capacity is high.



Form W cores are preformed and assembled in rectangular shape to provide a path for the magnetic flux parallel to the grain of the steel.

3 BUILT TO GIVE EXTRA VALUE

Wagner Form W Transformers are built the Wagner way—with the use of only the highest quality materials, carefully controlled production methods, and the skill acquired in sixty years of transformer building experience. That's why they pay dividends in longer service life.

Wagner Electric Corporation 1891 1951

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

T51-9

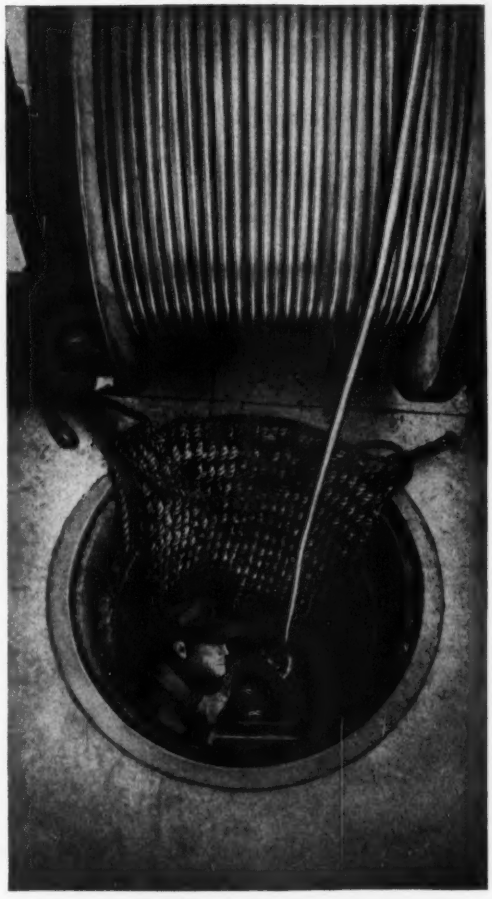
PAPER INSULATED CABLE

For outstanding, uninterrupted, dependable service . . . ROEBLING!

EXPERIENCE SHOWS you'll get maximum economy by putting circuits underground with Roebling Paper Insulated Lead Encased Cables. This immediately does away with the expensive maintenance of overhead lines. And Roebling cables . . . entirely produced in Roebling plants to the most exacting specifications... are your assurance of unsurpassed performance and low-cost service.

Roebling Shielded Type H is a foremost selection for 3-phase grounded neutral circuits from 13 to 33 kv. It is made in single and multiple conductor construction, in regular and Compack strand (round or sector). Where the cable will be exposed to electrolysis or corrosion, the conventional lead sheathing can be given an outer non-metallic protective jacket of ROESHEATH.

Large quantities of Roebling's complete electrical wire and cable line are required in the national rearmament program. The Roebling organization and distributors will, however, do everything possible to meet your delivery requirements. John A. Roebling's Sons Company—San Francisco—Los Angeles—Seattle.



ROEBLING

Atlanta, 924 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

Yours **FREE** *for the Asking*

MARKEL HEETAIRES
Electrical Wall Insert, Wall Surface Attachable and Portable Space Heaters with AUTOMATIC THERMOSTAT or MANUAL CONTROL
A Guide to Quick Heating

A GUIDE TO QUICK HEATING

How to Select the Right HEETAIRE for Every Purpose

Here's the first and only complete GUIDE to the selection of electrical wall-insert and wall-attachable space heaters!

It gives all the information about QUICK HEATING you've always wanted — types, sizes, heating principles, thermostatic heat controls, recommended wattages — plus an exclusive chart based on the four factors that determine the selection of the correct HEETAIRES.

It's yours for the asking — just drop us a card.

Chooose the Right HEETAIRE for Every Purpose!

Look at this Table of Contents

The Principles of HEETAIRES Types and Sizes

★ **THERMOSTATIC CONTROLLED Operation**

★ **Series 230 HEETAIRES . . . Fan-Forced Radiant Heat 1250 to 3000 Watts**

★ **Series 250 HEETAIRES . . . Fan-Forced Black Heat 1500 to 3000 Watts**

★ **Series 210 HEETAIRES . . . Fan-Forced Black Heat 3000 to 5000 Watts**

★ **Series 200 HEETAIRES . . . Radiant Heat 1000 to 2000 Watts**

★ **Series 240 HEETAIRES . . . Radiant Heat 1000 to 1500 Watts**

MARKEL . LA SALLE
ELECTRIC PRODUCTS INC. PRODUCTS INC.
148 SENECA STREET • BUFFALO 3, N. Y.

ELECTRICAL BOOKS

BASIC ELECTRON TUBES, by Donovan V. Geppert, 32 pages, 6x9, McGraw-Hill Book Co., $5. The text covers physical and electrical characteristics, theory and mathematics of 11 most basic types of electron tubes used in engineering. The approach is from a practical, down-to-earth viewpoint, without sacrificing essential theory and mathematics. Atomic theory and electron ballistics are covered as an integral part of the theory of each tube. The double cathode sheath theory in gas tubes is explained, giving a complete explanation of gaseous conduction phenomena. Each chapter is divided into four sections for logical and comprehensive presentation: presenting physical characteristics, electrical characteristics, theoretical explanations of the electrical characteristics, and the mathematics of the tube.

HANDBOOK OF POWER RESISTORS, compiled by H. F. Littlejohn Jr., edited by Christian E. Burckel and Associates, 195 pages, 5 x 7½, Ward Leonard Electric Co., $3. This handbook, a treatise on power resistors, is designed to furnish a practical knowledge of the construction of power resistors, their application and performance characteristics. The book represents the collective efforts of the engineering and sales staffs of Ward Leonard.

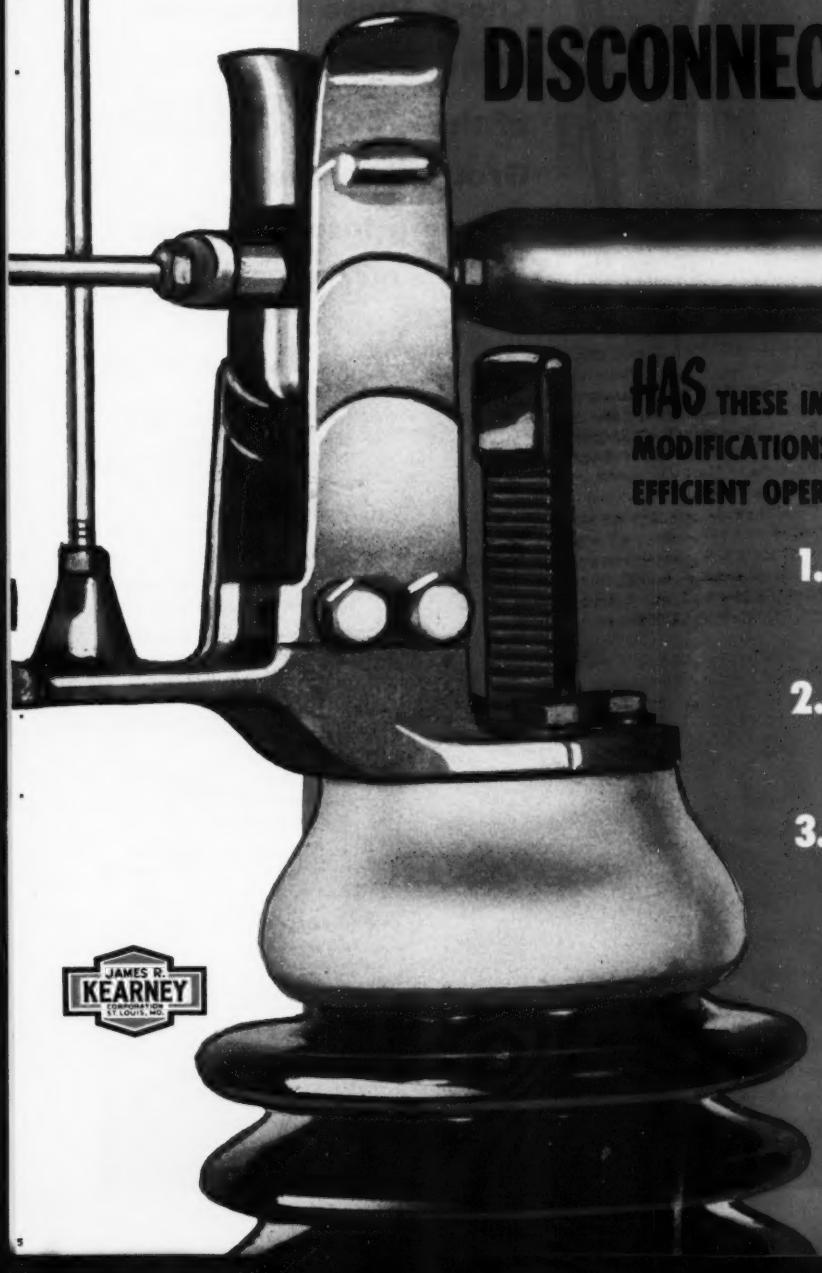
MAINTENANCE AND SERVICING OF ELECTRICAL INSTRUMENTS, by James Spencer, third edition, 256 pages, 4½ x 8, Instruments Publishing Co., (price not given). First written as a guide for teaching the subject, but because of the present emergency and the new applications for electrical indicating instruments, the guide information was amplified and put into book form. It now covers the construction, testing, applications, principles of operation and maintenance of electrical instruments.

TIME BASES (Scanning Generators), by O. S. Puckle, 387 pages, 5½ x 9, second edition, John Wiley & Sons Inc., $5. Time Bases has been completely revised for this edition and expanded by more than 150 pages. It covers the important electronic devices available for producing the time axis in television receivers, cathode ray oscillographs, engine indicators and apparatus involving precise timing or the measurement of time indicators. A new chapter has been added on Miller-capacitance time bases, also eight appendixes. Tables of data are spaced through the book.

THE NATURE OF POLYPHASE INDUCTION MACHINES, by Philip L. Alger, 397 pages, 6 x 9, $7.50. It offers an understanding of the behavior of the simplest and most widely used form of electric machine. The author carries the concept of energy being received, stored, transformed, and delivered through all aspects of motor performance. Formulas are given for reactance, power factor, torque, and magnetic forces; and methods for calculating locking, crawling, magnetic noise and voltage ripples are provided. The results are presented in algebraic formulas and equivalent circuits, with few symbols, and references to more specialized articles.

The NEW KEARNEY *Group Operated*

ROTATING INSULATOR TYPE DISCONNECT SWITCH



HAS THESE IMPORTANT MODIFICATIONS TO PROVIDE MORE EFFICIENT OPERATION — LONGER LIFE:

1. Heavy leaf type beryllium copper spring contacts with silver overlay at both ends of blade.
2. Fully adjustable to compensate for any changes in switch mounting structure.
3. Positive current path to blade through blade contacts at both ends of switch. Hinge mechanism does not carry current.

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Avenue
St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

See the following pages for additional features of this improved Kearney Switch

These Improvements

Check These Advanced Design Features of the NEW KEARNEY Group Operated Rotating Insulator Type DISCONNECT SWITCH

- √ Streamlined design with smooth edges throughout.
- √ Stop on base bearing easily adjusted to synchronize break on each phase.
- √ Blade operates in two Oilite bearings for all temperature operation. Bearings require no maintenance or lubrication.
- √ Blade lever adjustment sealed with noncorrosive grease.
- √ Stainless steel spring in neoprene jacket. Easily adjusted for desired counterbalance. (On switches rated 34.5KV and up.)
- √ Main hinge pin rotates in Oilite bearing.
- √ Arm rotates in completely weather-protected Oilite bearing in frame.
- √ Single arcing horn operates easily under ice. Easily replaced when necessary.
- √ Tubular, electrolytic bus bar copper blade.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

West Coast Distributor: MAYDWELL & HARTZELL

175

Specify KEARNEY Products . . .

Guarantee

COOLER, MAINTENANCE-FREE OPERATION

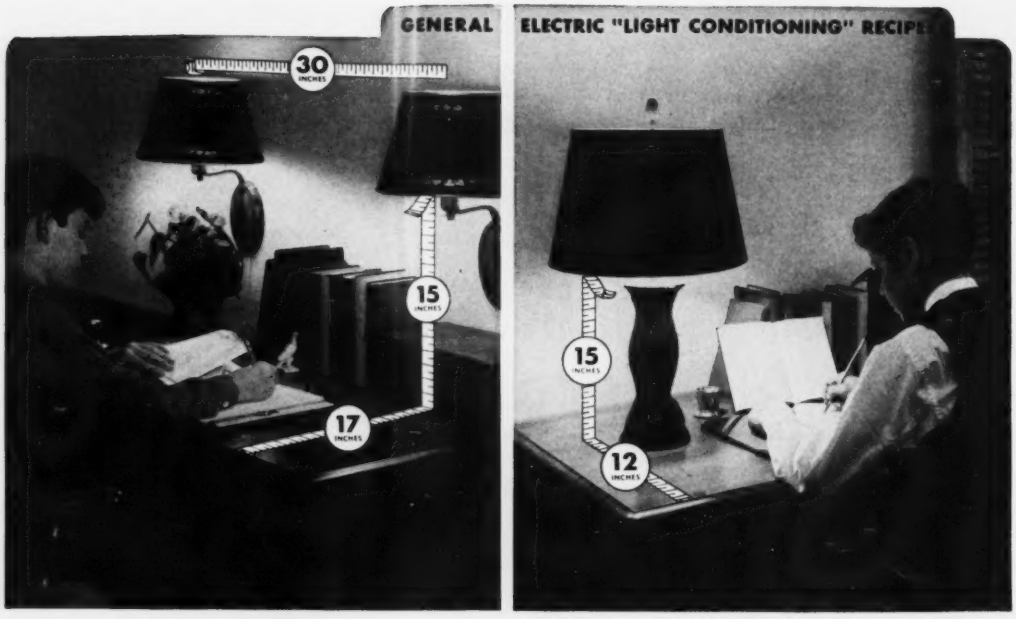
With this switch you get dependable performance under every variety of weather and operating conditions.

Kearney GROUP Operated Disconnect Switch Rotating Insulator Type 600 Amps., 7.5KV to 69KV; 400 Amps., 7.5KV to 34.5KV.

Write for more detailed information
Ask for bulletin 6-33

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Avenue • St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

Better Construction – SAFER Maintenance



Two ways to brighten a book...and a boy!

"THE way to improve Jimmy's marks, we'd always figured, was just to keep his nose to the grindstone. And try not to grumble when we had to place ours there, too—to help him find a state capital that kept getting lost or check a column of figures that wouldn't add.

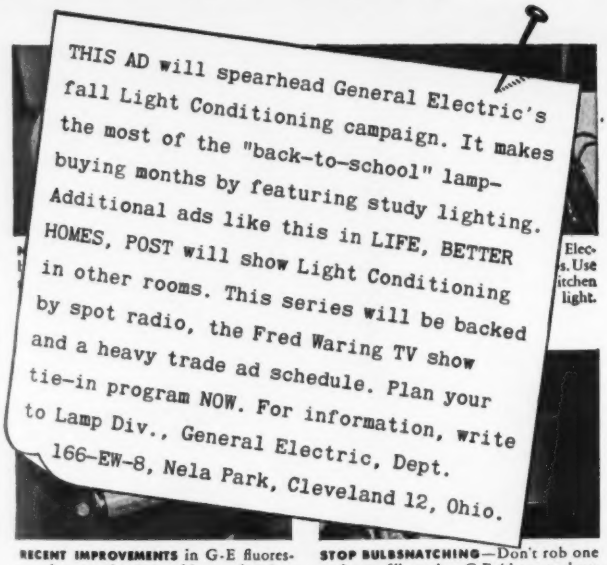
"But then we made a great discovery: a boy doesn't study with his nose—he uses his *eyes!*

"When we discovered Light Conditioning we found we could not only brighten Jimmy's books, but Jimmy, too—by reducing eyestrain, fatigue and distraction."

Light Conditioning tells you in recipe form exactly what size and type of bulbs to use in your lamps and fixtures, and how to locate them to get the right light for every seeing task.

The recipe at left above calls for two pin-up lamps placed as shown by tape measures, each with a G-E 100-watt White "Q-coat" bulb. Recipe at right above recommends 50-100-150 watt 3-lite bulb (or, for some table lamps, 150 watt bulb or 150 watt White Indirect-lite bulb).

FREE! NEW LIGHT CONDITIONING RECIPE BOOKLET Shows 22 lighting recipes. Covers every room. Specifies bulb sizes, fixtures, measurements. Write Lamp Division, General Electric, Department 166-EW8, Nela Park, Cleveland 12, Ohio.



THIS AD will spearhead General Electric's fall Light Conditioning campaign. It makes the most of the "back-to-school" lamp-buying months by featuring study lighting. Additional ads like this in LIFE, BETTER HOMES, POST will show Light Conditioning in other rooms. This series will be backed by spot radio, the Fred Waring TV show and a heavy trade ad schedule. Plan your tie-in program NOW. For information, write to Lamp Div., General Electric, Dept. 166-EW-8, Nela Park, Cleveland 12, Ohio.

Elec-s. Use itchen light.

RECENT IMPROVEMENTS in G-E fluorescent lamps make them a bigger value than ever. More efficient, longer lasting, with better color and uniformity, less end-blackening. 25-watt fluorescent **$1.00** plus tax.

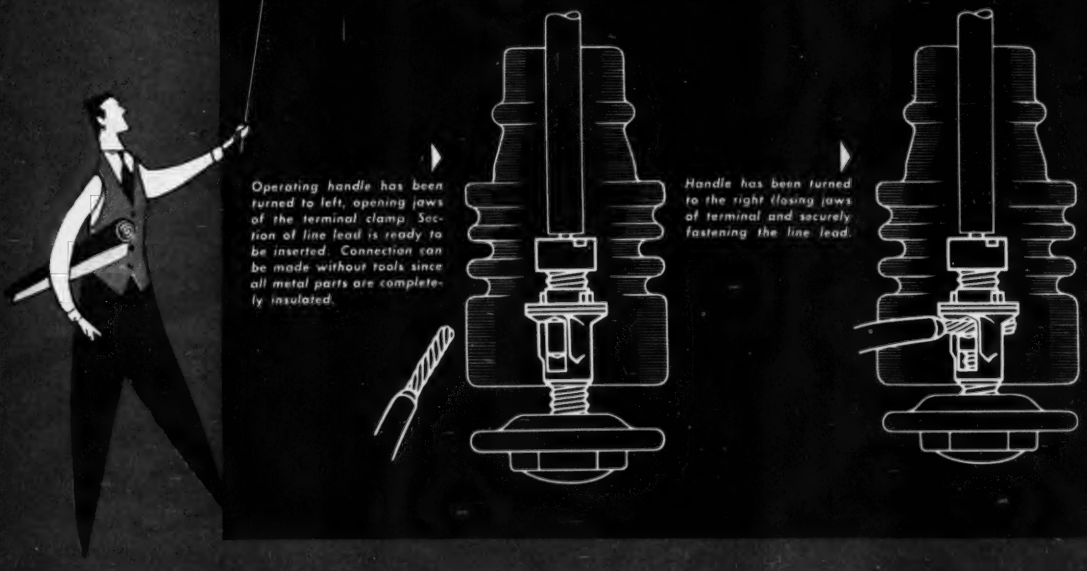
STOP BULBSNATCHING—Don't rob one socket to fill another. G-E 4-lamp package helps you keep spare bulbs on hand. Four 60-watt lamps (halls, closets) **56¢**. Four 100-watt (reading, general lighting) **64¢** plus tax.

You can put your confidence in—

GENERAL ELECTRIC

IT'S A FACT:

KUHLMAN QUICK-GRIP... MOST COPIED TRANSFORMER BUSHING... BECAUSE IT SIMPLIFIES LINE CONNECTION JOB!


Operating handle has been turned to left, opening jaws of the terminal clamp. Section of line lead is ready to be inserted. Connection can be made without tools since all metal parts are completely insulated.
Handle has been turned to the right closing jaws of terminal and securely fastening the line lead.

Here's the bushing terminal that is rapidly becoming the choice of transformer buyers all over the country . . . the Kuhlman "Quick-Grip!" Specified by utility engineers everywhere, many other transformer manufacturers have copied its design features.

Ask any lineman what he thinks of the Kuhlman "Quick-Grip." Let him tell you how it eases and speeds his job of making line connections by eliminating use of tools. All he does is insert the lead into the hole in the side of the bushing and secure the connection by simply turning the handle on the end of the terminal. That's all there is to it! The clamp accommodates full range of wire sizes prescribed by EEI-NEMA Standards; mounting hardware is inside the tank protected from corrosive effect of the atmosphere.

The "Quick-Grip" is favored too, because of its safety features. Heavy insulating knob prevents accidental contact with live parts. Lead enters through side of bushing eliminating necessity of gripping over the lead when making connections as in the case of a rotating chuck type terminal. Since there is only one entry hole for the lead, its sharp point cannot protrude on the opposite side of the bushing to be a hazard to the lineman.

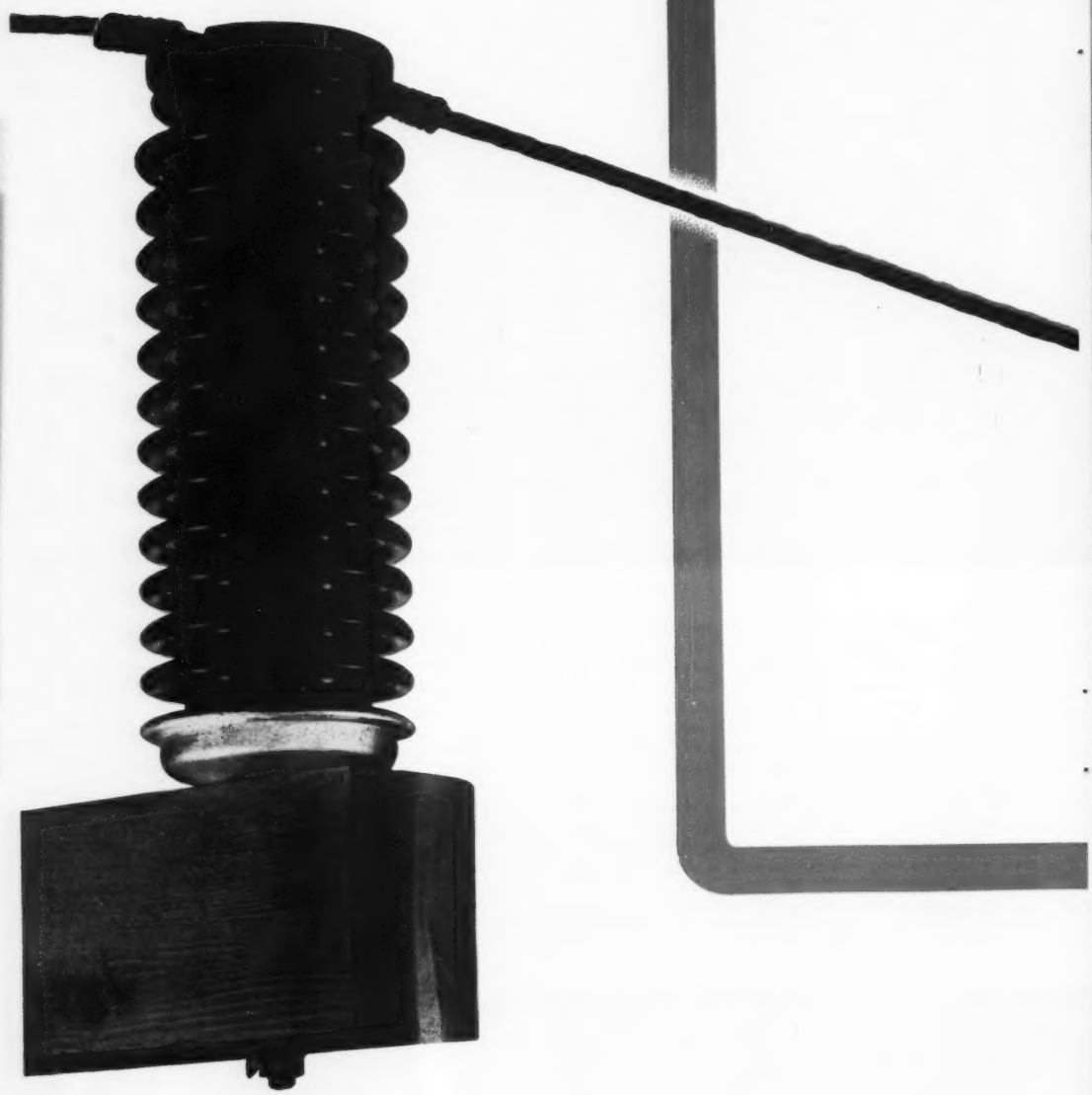
Write today for full details on the Kuhlman "Quick-Grip" bushing . . . it is available on all Kuhlman transformers 5KV and below where sidewall high voltage bushings are standard.

Kuhlman ELECTRIC COMPANY, BAY CITY, MICHIGAN

EXPORT REPRESENTATIVES: International Standard Electric Corporation, 67 Broad Street, New York 4, N. Y. Cable Address, Microphone, N. Y.

A complete transformer line for ALL your needs. Write for new Kuhlman bulletins on Distribution, Power, Dry Type, Street Lighting and Specialty units.

DID



YOU SAY, "COME BACK IN 20 YEARS"?

When we introduced the Lapp Line Post, we were confident that its revolutionary new design was matched by a revolutionary new order of performance . . . that for power transmission it would provide an *extra* margin of operating security—electrically and mechanically.

We showed our new development to engineering and operating men in power companies across the land. We had back of us a good record of sound ceramic production, and we offered an engineering conception that added up to an amazing combination of characteristics. And most of the places we went we got an answer that boiled down to : "Looks good—almost too good. That makes it suspicious. Let's see how good it looks after 15 or 20 years of service."

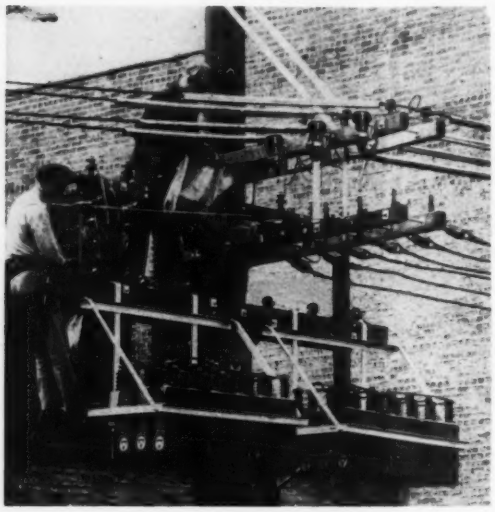
That was in 1931. Now we're back, with 20 years of service to substantiate our claims. For in spite of a natural skepticism, we did get more and more Line Posts in service. At the beginning, most of them in "trouble spots," where lightning conditions were so bad . . . or the Kids such good marksmen . . . or salt fog or industrial contamination so persistent . . . or radio interference such a problem . . . that operating people were ready to "try anything."

How's the record? Our original claims are still good. No radio interference . . . no puncture . . . no cracking . . . no cleaning . . . greater resistance to stones and bullets . . . better performance under arcover. And, with 20 years to establish our right to these claims, a new one which sums them all up: *Lines on Lapp Line Posts have fewer outages, require fewer insulator replacements, and less maintenance than comparable lines on any other type of insulator.*

If you held off on the "untried" Line Post design, it's because you wanted to be *certain* about performance of the insulators on your lines. That makes you the fellow who should be most anxious to take advantage of the operating superiority of the *proved* Line Post design. It will make quite a difference in your company's operating and maintenance costs over the next 20 years.

Lapp

PRODUCT NEWS

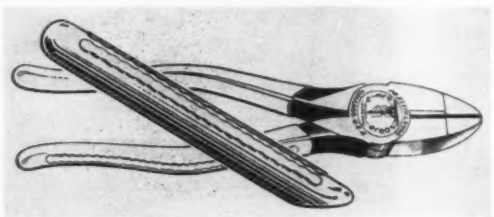


Open Rack Capacitor Assemblies

(1) Line Material Co., Milwaukee, Wis.

Completely fabricated at the factory, these racks require only connection of the high-voltage leads to the switch terminals and interconnection of the control wiring from the control to a terminal box included with each rack.

These racks are available in both switched and unswitched varieties, from 2,400 through 13,800 v, and from 225 to 300 kva. The picture shows two 225-kvar racks being installed on a single Class 1 pole. It is claimed that field labor is substantially reduced so that installed cost is only slightly above the cost of the rack assembly.



(2) This plastic cover slips onto plier handles to give a firm, nonskid grip. It is made of transparent plastic in bright maroon and is available in three sizes: No. 60 to fit 6-in. pliers; No. 70 for 7-in. pliers and No. 89 for 8- or 9-in. pliers. Flexibility of the material permits it to conform to the shape of any side-cutting plier handle. This device eliminates practice of taping. Made by Mathias Klein & Sons, 3200 Belmont Ave., Chicago 18, Ill.

For bulletins, fill in coupon on page 61

Resilient-Base Construction

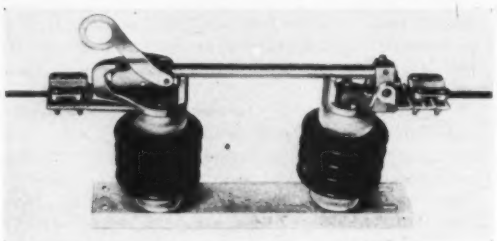
(3) General Electric Co., Schenectady 5, N. Y.

The Tri-Clad line of single-phase, capacitor induction motors is being manufactured with a resilient base for use where freedom from vibration and extra quiet operation is required. The special mounting prevents transmission of torque pulsation to the driven machine; is available on ½- to 5-hp motors.

Starter

(4) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

The combination Life-Linestarter, class 11-206-NJ, is designed to meet requirements of the J.I.C. electrical standards for industrial equipment and the machine tool electrical specifications. It is available in NEMA sizes 1 through 5, with ratings up to 200 hp, 400 v polyphase; comes standard with a 220/440-v primary, 110-v fused secondary, control circuit transformer that can be used on either 220- or 440-v supply voltage, 50 or 60 cycles.



Disconnect Switch

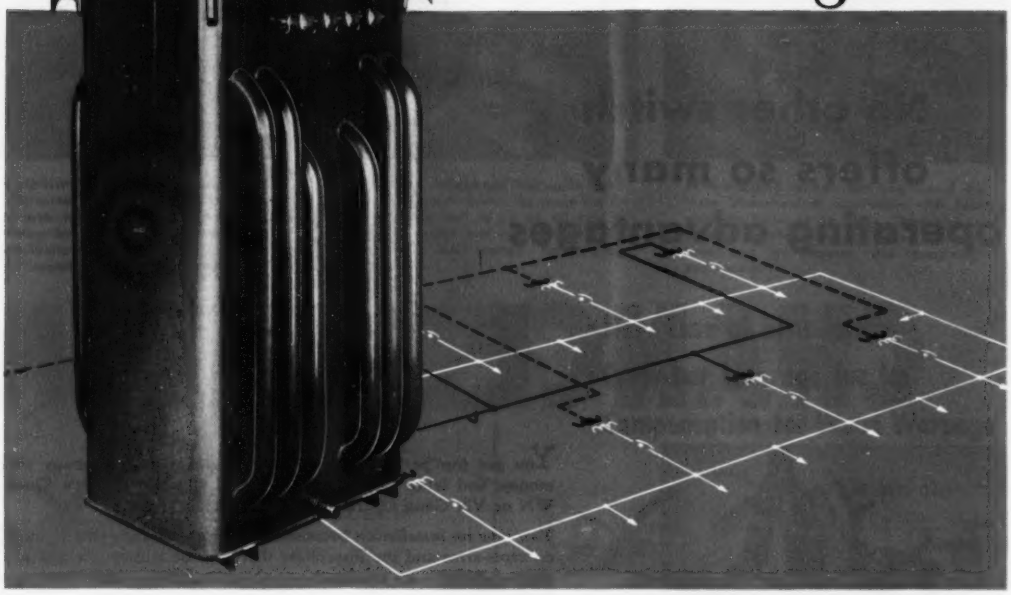
(5) The James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

A new type of single-pole, single-throw disconnect switch is rated 7,500 to 69,000 v, 400 to 600 amp; features ultra-high contact pressures. High pressure provides a current path completely through the switch that approximates closely that of an unbroken conductor; therefore operation is at substantially lower temperatures, according to the manufacturer.

A toggle mechanism eliminates all contact springs. Separate arcing areas give protection against pitting the main contacts. The first part of the opening motion causes the contacts to disengage but keeps the blade in contact with a projection of the latch. After sufficient clearance is obtained between contacts, the blade clears with minimum arcing at the projection of the latch only.

Thick coatings of ice are quickly broken by the blade because of mechanical advantage supplied by the toggle action, according to the manufacturer. When the blade is closed, all parts are locked tightly together and current cannot spark anywhere in the assembly, it is stated. Catalog sheet 6-25 explains the device in detail.

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



EXTEND NETWORK ADVANTAGES
to "Borderline" Areas

Where areas of your system make it difficult to justify an underground network, Westinghouse Type "S" Transformers help make economical overhead networks possible. Thus, the advantages of greater service continuity and system flexibility can be extended to heavy-load residential sections, light business districts and similar "borderline" areas.

No matter what type of network system you plan, or what your installation problems may be, Westinghouse can help you keep costs down . . . now . . . and in the future.

HERE'S WHY:

Now—There is a Westinghouse Network Transformer specifically designed to answer each of your network problems. In addition to TYPE "S", there are LIQUID-FILLED (oil or Inerteen®), most economical for general use; "ASL" VENTILATED DRY-TYPES, ideal for indoor service; and SEALED DRY-TYPES, the safest transformers ever built. Standardized construction provides lower initial cost and lower installed cost, too. Special hook-up problems are eliminated.

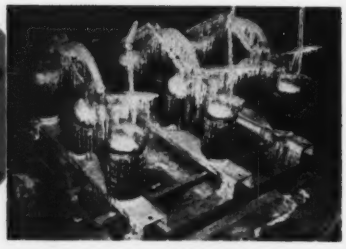
And in the Future—Years of leadership in the design and construction of network transformers show in the high quality and maintenance-free operation of Westinghouse Transformers. In addition, our complete facilities . . . engineers and calculating boards . . . are available to help you in your network planning, to make future expansion more economical.

Ask your Westinghouse representative for further information, or write for Booklets B-4082 and B-4002-A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70559

Westinghouse
NETWORK TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

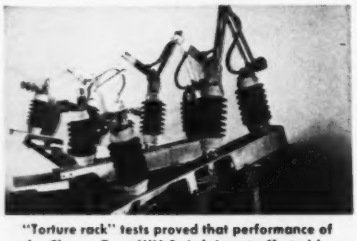
ICE PROBLEMS? Read This...



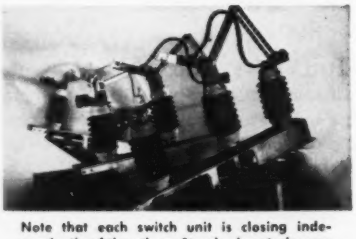
This Chance three phase type WN Switch, with standard controls, was coated in the closed position with over ¾" of hard, clear (bubble-free), ice made with distilled water slowly sprinkled on the switch at various angles to simulate the most severe conditions.

No other switch offers so many operating advantages

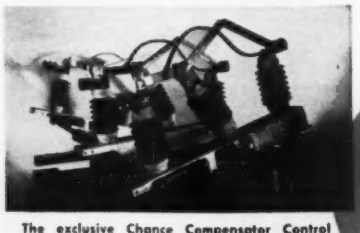
CHANCE WN-VN



"Torture rack" tests proved that performance of the Chance Type WN Switch is not affected by any conceivable warpage of cross-arms. Note side of base is cut away to show control operation.



Note that each switch unit is closing independently of the others. Standard controls were used and no extra leverage was applied. Switch operated easily in spite of the most extreme distortion.



The exclusive Chance Compensator Control mechanism brings all three blades of the switch into completely closed position. No switch or control adjustments were required to compensate for this extreme distortion.

You get top performance under all conditions plus many time, money, and labor saving features when you buy the new Chance WN or VN Gang Operated Switches.

You save on installation because the flanged bases are easy to mount on cross-arms and the interphase shaft can be laid in position after the switch units are mounted—no threading of the shaft is required.

You get dependable operation under all conditions of climate or stress. The exclusive Compensator Control mechanism is housed under the switch base, protected from the weather. This control operates each switch unit independently so that each blade in a three pole switch makes complete contact regardless of warping, twisting, settling or bowing of the wood supporting structure.

A new "crow-bar action" blade, plus the *extra leverage* of the weather protected Compensator Control, makes Chance WN or VN Switches your best buy for performance under heavy ice.

Maintenance time is negligible with WN or VN Switches because all bearings are lifetime lubricated, the flanged bases don't cut into the wood supports and loosen the bolts, and the switch performs properly regardless of structural warpage.

The Compensator Control prevents shock to the insulators and damage to the switch blade in closing, because the closing action is reversed when the control goes through toggle on each individual switch unit. *Slamming the switch closed will not break insulators.* Heavy castings and extra rugged construction also mean long service life without maintenance.

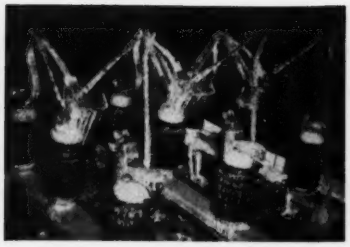
For reliable switching under all conditions, plus time saving installation advantages, specify Chance Type WN or VN Switches. Write for complete information and prices.

Current ratings 200, 400, 600 amps.,
Voltage ratings 7.5, 15, 23, 34.5 and 46 kv.

Warped Cross-arms don't affect WN or VN

You know

Various tests were made at temperatures from 20° F. above zero to 16° F. below zero. After 12 hours of sprinkling, hard blows with a hammer only chipped the ice, leaving a white mark. Yet, one man at the controls opened the 3 phase switch without difficulty.



The switch was cleaned and iced again in the fully open position, under the same conditions, with over ¾" of ice on all moving parts of the switch and controls. Operator (background) has started the closing movement.

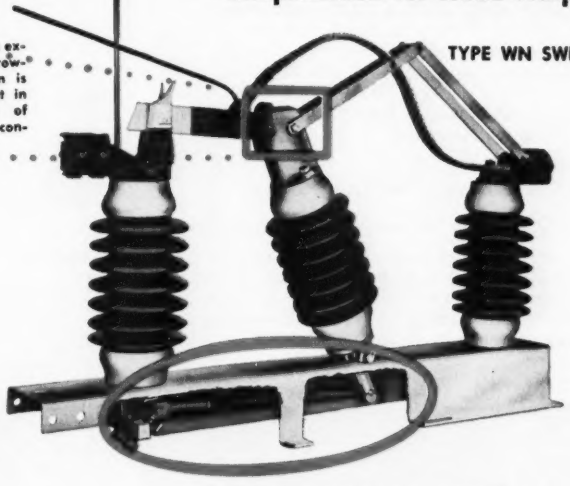
With standard controls one man closed the three phase switch completely with four chopping blows of the blade. There was no damage to the switch in either of these tests and performance was completely satisfactory.

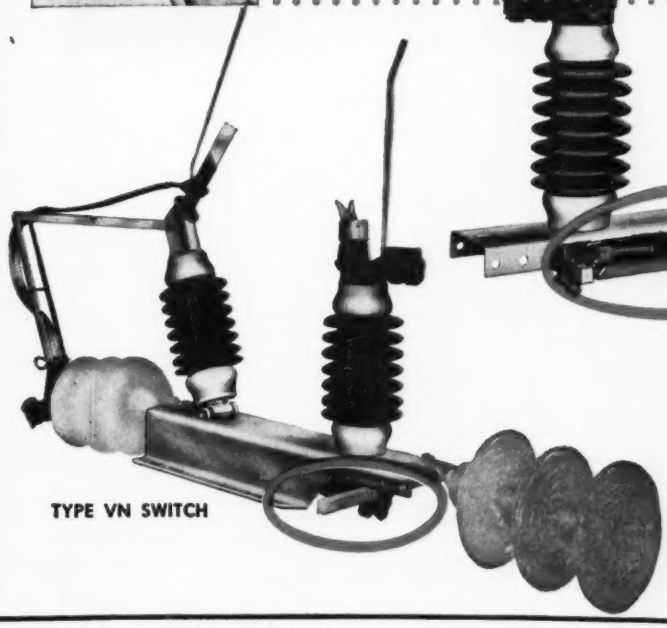
SWITCHES

- New Ease of Installation
- Crow-bar Leverage for Ice
- Compensation for Wood Warpage

Double exposure shows exclusive ice breaking "crow-bar action." Pivot pin is forced up against slot in blade — prying rear of blade up ⅜" before contact end is lifted.

TYPE WN SWITCH





TYPE VN SWITCH

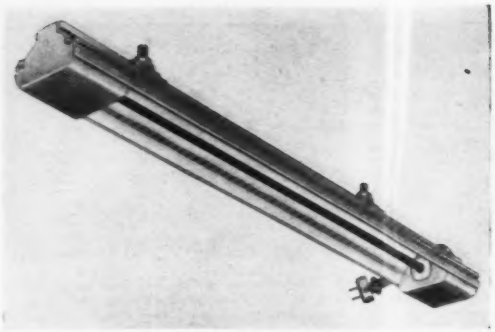
COMPENSATOR CONTROL MECHANISM

Cutaway sections of the flanged mounting base show the weather protected Compensator Control that eliminates closing shock and gives extra leverage for smooth, easy operation. This mechanism operates each switch unit independently of the others to give positive, uniform blade contact on all phases. Effect of distortion on the control shaft is negligible, as each blade in a three pole switch arrangement makes complete contact without affecting either of the other two blades.

it's RIGHT when you specify CHANCE

A. B. CHANCE COMPANY CENTRALIA, MO., SAN FRANCISCO, CALIF.

C50-22



Infrared Heaters

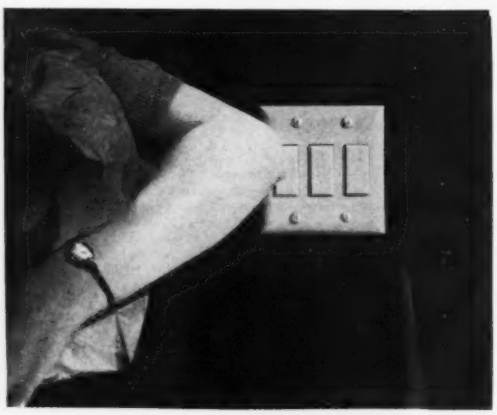
(6) Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

Two Chromalox all-metal electric infrared heaters are designed for keeping food hot, without cooking it further or drying it out. The heaters are plug-in devices and, according to the manufacturer, can be installed inexpensively in most locations. Main components are an aluminum body, Chromalox tubular element and highly polished Alzaked aluminum reflector. Catalog FW-800 is rated 800 w, has a heated length of 23 in.; catalog FW-1100 is rated 1,100 w, has a heated length of 39 in. Bulletin L-1062, available from the manufacturer, gives details about the new unit.

Temperature Control for Transformers

(7) General Electric Co., Schenectady 5, N. Y.

A new line of temperature control devices for power transformers includes a Hotspot indicator relay, a local and a remote indicator. The relay gives in one unit hot-spot temperature readings and automatic starting of fans, oil pumps and alarms in desired sequence at a predetermined temperature.



(8) A flick of the elbow turns on the lights with this switch, made by the Touch Plate Mfg. Co., Long Beach, Calif. The wall plate and switch plates are molded of Plaskon urea by Reinhold-Geiger Plastics, Inc., Los Angeles. Easy cleaning is claimed.

Connector

(9) Fargo Mfg. Co. Inc., Poughkeepsie, N. Y.

A new one-piece, vise-type connector, the 9000 series, is for aluminum-to-aluminum or aluminum-to-copper connections. Jaws are designed for a wide range of sizes. They can be used with or without a spacer bar and have long, enclosed threads that permit ready salvage for reuse. The 9000 series is of cast aluminum, without a spacer bar. The 9000A series is for aluminum-to-aluminum connections where an aluminum spacer bar is desired and the 9000AC series is for aluminum-to-copper connections; has a female half of cast aluminum and a male half of cast bronze, with a plated electrolytic copper spacer bar.

Pack Set Power Unit

(10) Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.

Plug-in power connection and switching facilities on this new power supply permit transfer of the FM 2-way radiophone pack unit from internal dry battery to an external source. The power supply makes it possible to operate the pack set from 117-v a-c or 6-v d-c primary power supply. It is of all-steel, welded construction and is finished in grey Hammerloid enamel. The complete model includes a bracket to which the power supply is mounted by means of a quick-release cowl fastener. All necessary cables and connectors come with the unit.

Home Heaters

(11) Westinghouse Electric Corp., Sunnyvale, Calif.

A new line of wall-mounted electric home-heating units maintains desired room temperature automatically by a built-in thermostat with Adjust-o-matic control. The 3-position switch (low, off, high) is similar to the type used on electric ranges. The new heaters come in nine ratings, ranging from 1 to 6 kw. All models operate on 230-240-v a-c current.

For Additional Information
Fill in the Coupon on Page 61

JOHN LINEMAN SAYS:

For Secondary Service

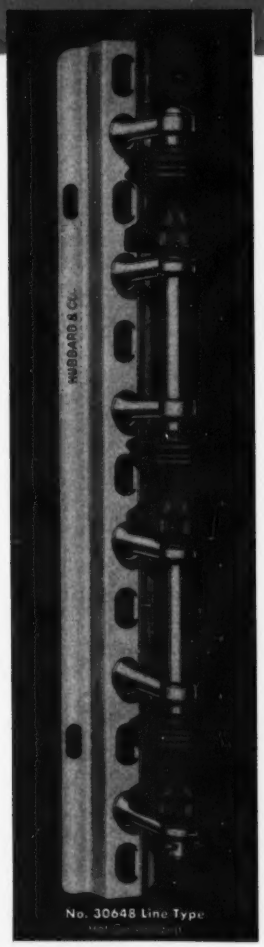
HUB-RAKS COME FIRST

"Gosh, right through the center of every hole."

"I thought I was husky, but I'm not in it with the HUB-RAK."

"For back-to-back mounting, bolts do double duty."

"If there's a place to hang it, there's a hole to match."



HUB-RAKS are furnished for 1 to 4 line wires with conductor spacings from 4 to 12 inches.

"Points strong as an ox . . . smoothly rounded too."

"Highest grade porcelain insulators, smooth surfaces, sure easy on conductors."

"Installation of replacement . . . it's dead easy with the HUB-RAK."

"It sure is the finest rack ever made."

IN STOCK FOR IMMEDIATE SHIPMENT FROM THE WAREHOUSES OF

GENERAL ELECTRIC SUPPLY CORPORATION

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SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

Lower Cost Energy for Northern Missouri

BETTER TRANSFORMER PERFORMANCE is one explanation why you pay lower than World War II prices for energy at a time when prices are at an all time high. Four Allis-Chalmers transformers installed at the city of Mexico, Missouri, station — and many Allis-Chalmers transformers on their northern network — are helping Missouri Power and Light company sell economical energy.

Here are a few reasons why:

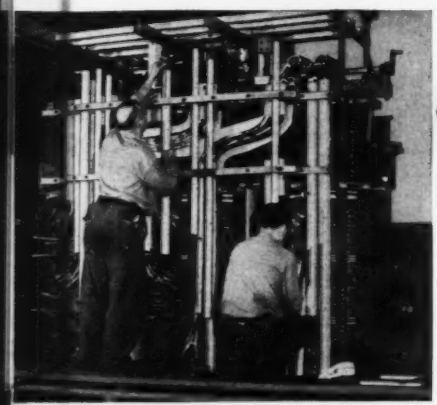
Oil sealed inert gas system guards the transformers against moisture and oxygen and inhibits sludge and acid formation. This original Allis-Chalmers designed protective system is standard on over 5,000,000 kva of American power transformers. Its low operating pressure, seldom exceeding one pound per square inch, and controlled gasket compression, boosts gasket life. There are no expensive, sensitive gages or reduction valves to maintain.

To help Missouri Power and Light company make important savings and still operate safely without large stocks of spare bushings . . . all these transformers have interchangeable bushings. Throat connection is of special design, carrying power through plant walls from the tertiary of the 3750 kva transformer to the 480 volt switchgear.

To give you more transformer performance Allis-Chalmers engineers are tackling problems of noise level in their sound laboratory. They're solving the corona problem so that your Allis-Chalmers transformers of the future will have even better surge, overload and lightning protection.

Because they're designed better you'll continue to see an ever increasing number of Allis-Chalmers transformers on the systems of the nation's power users. For information or service call in your A-C sales representative. Offices in 64 principal cities. Allis-Chalmers, Milwaukee 1, Wisconsin.

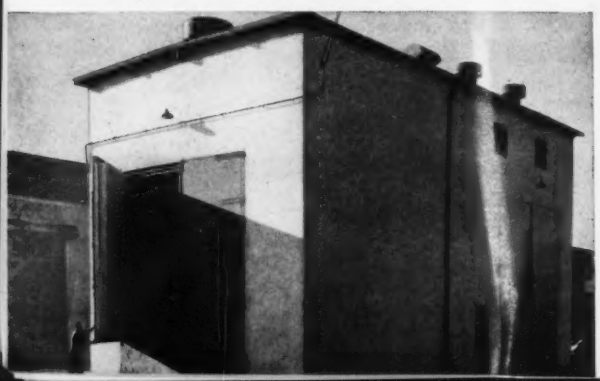
A-3451



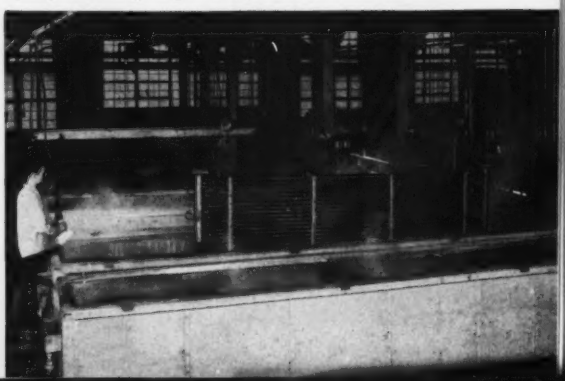
High voltage windings, coils and leads are strongly supported and securely braced as this high voltage view of core and coils shows. Coils are subjected to alternate baking and varnish treatments to shrink, dry and render them impervious to moisture. Leads from windings are mechanically supported and heavily insulated by encasement in machine wound tubing.

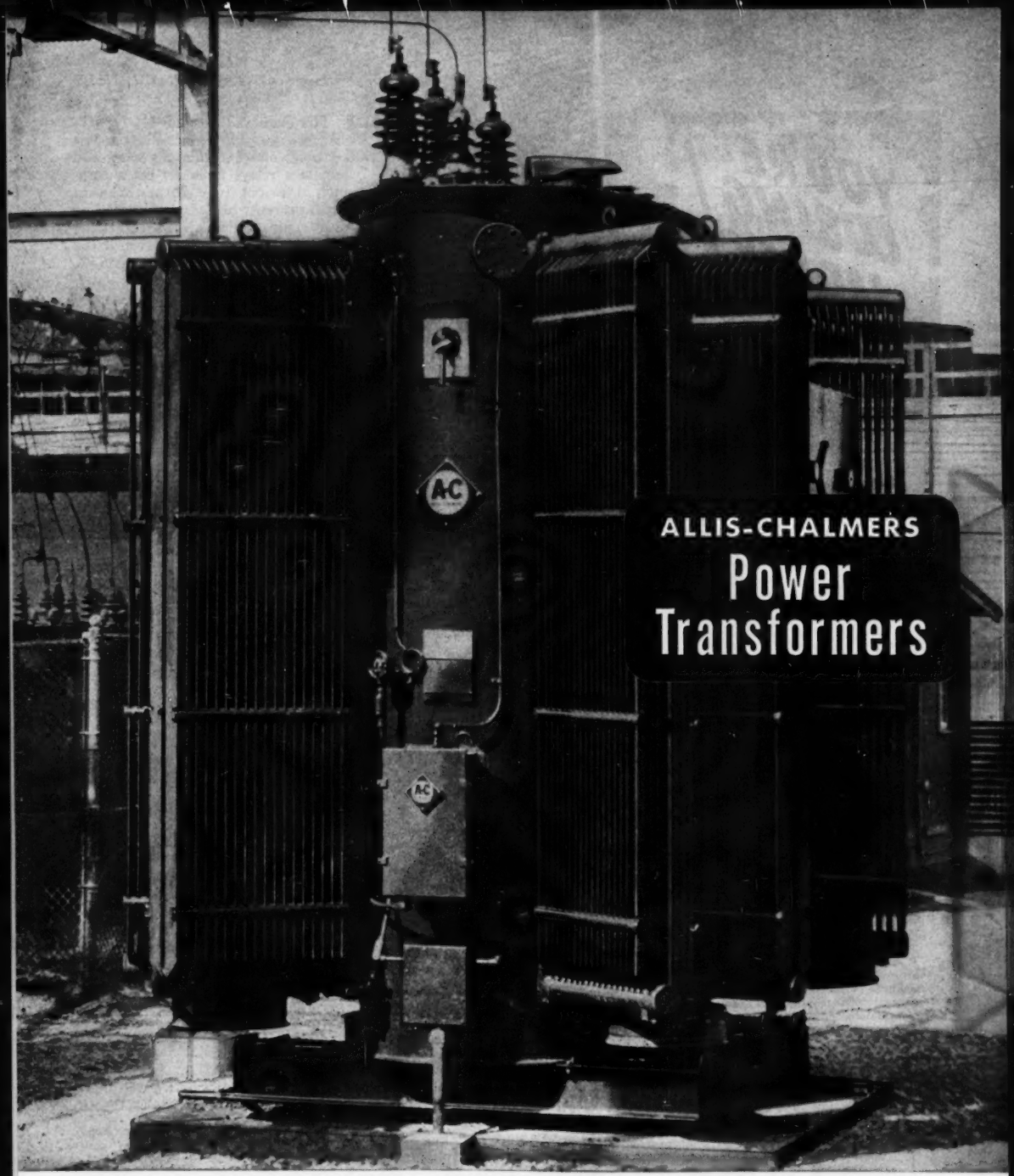
By providing close average voltage for all types of loads, this easily adjusted 375 AFR feeder voltage regulator (rated 4160 volts) regulates the power supply for the city. In the background is a 3750 kva power transformer that steps the voltage down from 13.3 kv to 4.16 kv for the city of Mexico, Missouri. This transformer has a 480 volt tertiary winding to supply power to the plant auxiliaries.

One of the largest and the best of its kind, this sound-proof engineering laboratory is used for audio noise and temperature testing. Two-foot walls are made of concrete, concrete block and air pockets, fiber glass and acoustic tile.



Radiators are made corrosion resistant by a 5-step *Bonderizing* process and then rotary flow painted with two coats of tough, baked-on enamel. *Bonderizing* converts the metal surface to a non-metallic phosphate coating integral with the metal.





This 10,000 kva power transformer steps up voltage from 13.3 to 33 kv from generator number 2 to plant substation bus. High voltage bushings are interchangeable throughout the system where ratings permit. Provision has been made for relocation of low voltage bushings through the cover should future station design eliminate low voltage throat.

ALLIS-CHALMERS

IF YOUR MOTORS ARE NOT EQUIPPED WITH

GOOD

MOTOR AND GENERATOR

BRUSHES

● A hole in your trouser pocket is an expensive experience! For "good" motor and generator brush performance look to an organization that develops and manufactures motor and generator brushes from the raw material to the finished product.

Special designs and carbon specialties are also an important part of our service to you. Send us your problem and we will place in your hands pertinent information and literature, together with our engineer's recommendations.

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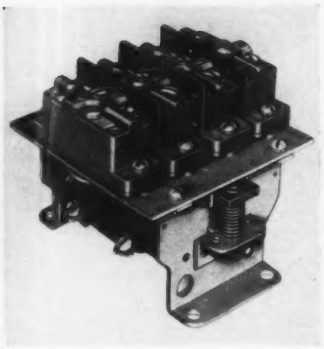
THE OHIO CARBON COMPANY

12508 BEREA ROAD • CLEVELAND 11, OHIO



Four-Pole Relay

(12) Square D Co., 4335 Valley Blvd., Los Angeles 32, Calif.

This class 8501 type PO4 4-pole relay expands a line formerly obtainable in a maximum of three poles. It is said to be particularly well suited for control assemblers, since all terminals are exposed, it is easily accessible and occupies a small space on the panel.

The device has four normally open and four normally closed contacts, allowing the circuit arrangement to be changed from normally open to normally closed by changing the incoming wires to different terminals. When used in circuits of the same polarity, four normally open and four normally closed contacts are available.

Each of the four snap-action contact mechanisms is self-contained in a melamine case and may be removed for inspection or replacement by loosening two screws. All contacts are silver to silver.

The relay is rated 10 amp noninductive, with inductive ratings of 5 amp at 600 v, 15 amp at 110 v. Coils are available for 6-600 v, 25-60 cycles. Bulletin 8501-P describes the device.

Voltage Regulator

(13) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Type URL-16, 16-step, pole-type feeder voltage regulator for rural and suburban lines or substations comes in ratings from 12.5 to 76.2 kva single phase and at standard voltages of 7,620 and below. It provides ±10% regulation in sixteen 1¼% steps and is intended for applications in which the 10% range of the type URL-8 is not sufficient.

The simple tap changer, with direct motor drive, is oil immersed. A reversing switch provides the 10% regulation on either side of the regulator neutral position.

This regulator has the CJ-1 package control relay, including motor control, voltage regulating relay and auxiliary relays mounted on a common draw-out type flexitest chassis. Separate resistance and reactance line drop compensation gives a full range of line drop compensation even if the regulator is carrying as little as 67% of rated load, the manufacturer states.

Wireholders

(14) Line Material Co., Milwaukee, Wis.

The manufacturer's line of reinforced wireholders has been redesigned to give greater mechanical strength. A new frame assembly held snugly to the side grooves of the insulator with a copper rivet is a feature of the improved wireholder, which provides a dead-end pull of 1,800 lb, a 90° side pull of 1,600 lb and a 45° side pull of 1,750 lb.

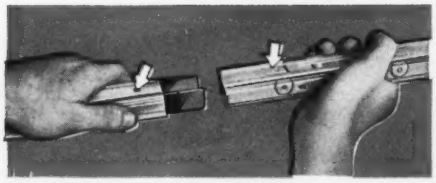
All steel parts are hot tip galvanized. The wireholder is available with a dry process white or brown porcelain insulator. It is REA approved.

(15) **MOTOR**—New totally enclosed, explosion-proof d-c Life-Line mining motors, either nonventilated or fan cooled, are available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. They conform to designs approved by the U. S. Bureau of Mines for use in gassy and dusty mines; will withstand an internal explosion and will not ignite an explosive mixture outside the motor, the manufacturer reports.

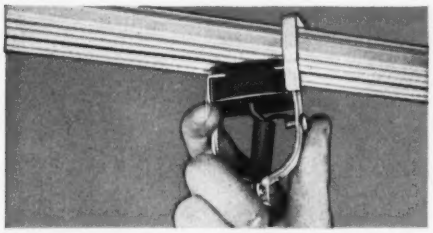
(16) **FITTINGS**—Addition to the Gedney line is the no-thread 90° short elbow for heavy-wall conduit. Available in a range of sizes from ½ to 2 in. from Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

Flexible lighting system that can be easily changed without rewiring

Move or add lights *anytime, anywhere* with BullDog Universal Trol-E-Duct



Duct sections are joined without tools, nuts or screws. Prefabricated and standardized in lengths from one to ten feet, they can be dismantled and reinstalled anytime, anywhere without scrapping a single part.



To tap off power at any point along the slot, simply insert twist-out plug and give it a 90° turn. Plugs are grounded on steel casing before contacts touch bus bars; narrow-access slot protects operator.

Trolley-type outlets are used where mobility is a prime requisite—such as for small portable tools or for drop-cord lighting in stock bins and inspection areas.

Safe, simple, quick! Tap off power from totally enclosed bus bars *at any point* along the continuously slotted duct with handy trolleys or twist-out plugs. Universal Trol-E-Duct both supports and supplies current to these fluorescent lighting fixtures.

Meet changing conditions quickly, economically with this truly flexible lighting system.

To move or add lights, simply pick the right spot and insert handy twist-out plug or trolley. Every inch of this money-saving 50-ampere duct system is a tap-off! Prefabricated and standardized in lengths from one to ten feet, it can be dismantled and moved to a new location without scrapping a single part.

Call in your nearby BullDog Field Engineer for more information about this modern lighting system. He will be glad to show you an installation near your own office. Or write BullDog direct for descriptive literature.

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

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1720 N.E. Sixth Avenue Tel. Tuxedo 5191
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Safety Switchboard Company
1445 Stevenson Street Tel. Hemlock 1-2470
San Francisco 3, Calif.

Paul L. Mullenbach Co.
3008 E. Olympic Blvd. Tel. Angelus 9-8101
Los Angeles 23, Calif.

A NEW 500-KVA General Electric network transformer is lowered into its vault in St. Louis. The throat-mounted G-E network protector is shown on the right; the high-voltage switch is on the opposite end of the transformer.

More Capacity for St. Louis' Network System

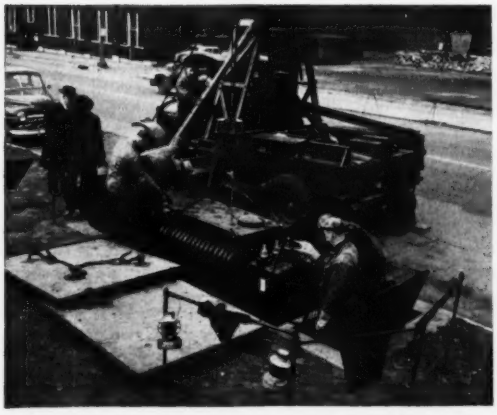
Installation of this G-E Network Unit demonstrates once more how a network eliminates headaches connected with load growth

It's an old story to users of networks, but still mighty impressive—the ease with which you can meet increased loads, once you have gone to a network system.

The place is St. Louis. The utility, the Union Electric Company. Load in the area around Clark Avenue and 15th Street had grown to the point where an additional transformer was needed.

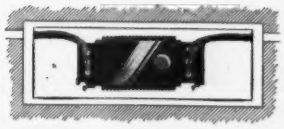
With a network, this addition was easy! A vault was constructed. A high-voltage feeder extended two blocks, from Market and 14th. The secondary cable brought into the vault. Then, with everything ready, and at the convenience of the construction crew, a new 500-kva transformer was installed—and connected during the daytime, with no interruption of service. With a total of three different high-voltage feeders serving the area, the one involved in this installation was killed while the new network unit was being connected. When all was set, the feeder was re-energized and the new transformer picked up its share of the network load.

With a network, service connections as well as low voltage grid connections are provided initially thus eliminating any need for rearrangement or reinforcement when a new transformer is added. In every respect, each added transformer represents an orderly step in system growth that was all automatically provided for when the network was first installed. *General Electric Company, Schenectady 5, New York*

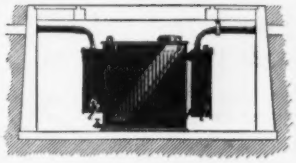


ALMOST IN PLACE! By using standard G-E network units, Union Electric Co. has kept vault construction costs to a minimum. Complete servicing of the transformer, switch, and protector can be done from the two ends—so that the vault can be made narrow enough to fit between sidewalk and curb.

Narrow, shallow vaults when you use G-E Standardized Network Equipment



With manhole openings at both ends, vault need be only 14' long, 4½' wide for a 500-kva transformer.



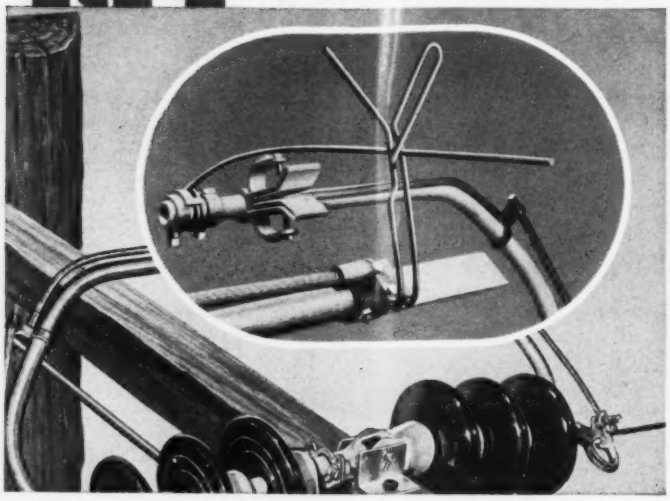
A vault depth of 7' below roof slab will provide sufficient room for maintenance and inspection.

GENERAL ELECTRIC

402-109

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

KPF POLE TOP SWITCHES



Drop 40 miles of 69 kv lines with KPF Quick-Break pole top switch

Operating engineers tell us KPF switches with Quick-Break attachment are the most outstanding air-break switch improvement in 25 years. Before development of this Quick-Break device, pole top switching of 69 kv circuits was limited to some 6 miles of line. Now, operating experience shows that 40 miles of 69 kv line can safely be dropped with this equipment.

The secret of the KPF Quick-Break is a heavy-duty cat's whisker which whips free in a split second as the switch is opened. This mechanism prevents establishment of an arc; thus critical arc length is no problem.

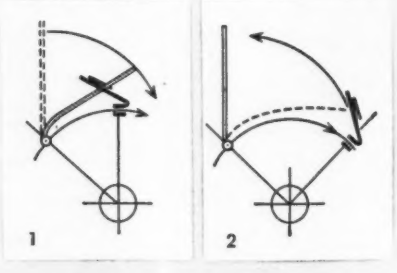
The KPF Quick-Break attachment is simply and ruggedly constructed for low cost, long life and all-weather dependability. It is available for all KPF switches rated 15 to 69 kv.

HERE'S HOW KPF QUICK-BREAK WORKS

1. Spring rod winds to full tension as switch opens.

2. Rod springs clear, breaking contact at high speed.

Write for details of KPF Quick-Break attachment and low cost, long-lasting, easy-to-install KPF Switches.



KPF ELECTRIC COMPANY
1624 E. Alpine Avenue • Stockton, California

(17) Three large-sized Pengo twin-helix earth augers have been added to the line made by Petersen Engineering Co., Santa Clara, Calif. With diameters of 42, 48 and 54 in., the new augers are for use with all popular makes of earth boring machines. Eleven other Pengo auger sizes range from 10 to 36 in. Catalog offered.

Overload Indicator

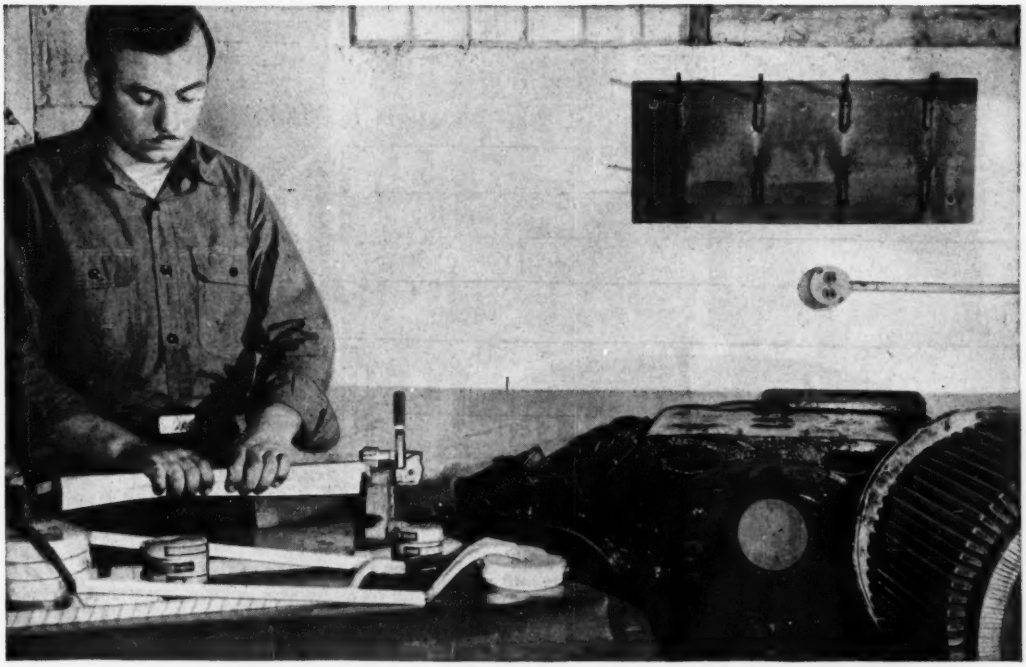
(18) Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

This manufacturer's distribution transformers are available with a new overload indicator operated by a thermostatic element in the top oil. The new device operates as a signal warning only and does not interrupt the continuity of service to a customer in any way.

The thermostatic element is designed to trip 80 C top oil temperature. This corresponds to 50 C maximum top oil rise above a 30 C average ambient temperature. When the oil reaches the predetermined temperature, a signal light snaps on and stays on until turned off by the utility serviceman.

The indicator is described by the manufacturer as an economical maintenance-free signal device for systems where more complicated equipment would not be justified.

(19) MOLDING COMPOUND—Plaskon alkyd 422, described as a flame-resistant compound with improved electrical properties, will be sold in granular form by the Plaskon Division, Libbey-Owens-Ford Glass Co., Toledo Ohio. Comparable in most other respects to Plaskon alkyds 411 and 420, the new material is listed as self-extinguishing under ASTM and Underwriters' flame resistance tests. It retains its electrical properties on exposure to high humidities and temperatures and quickly regains electrical properties after periods of immersion, the announcement states.



Everson Electric Co. counts on SILASTIC TAPE "...When insulation must stand up at 500° F"

For outstanding insulation characteristics and for lasting performance at high temperatures, the choice is Silastic* Tape at Everson Electric Company, Allentown, Pa., manufacturers of armature, field and stator coils for railway and heavy-duty industrial applications.

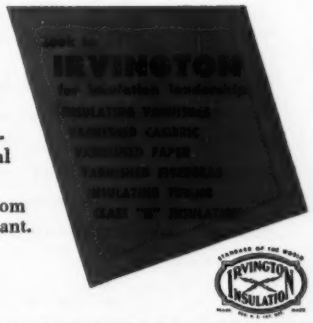
"The ability of Irvington's Silastic Tape to stand operating temperatures up to 500° F increases the life of our coils," says Everson, "and it saves space *too.*"

Here are some *other* reasons why so many leading manufacturers turn to Silastic Tape:

The combination of Fiberglas** cloth and Silastic rubber impregnation and coating gives high tensile strength and excellent chemical resistance, even at high temperatures.

After vulcanizing, Silastic Tape forms a solid insulation mass, free from voids or air pockets . . . moisture-proof, extremely abrasion-resistant.

Worth looking into, isn't it? Ask for the full story today!



*® Dow Corning **® Owens Corning Fiberglas Corp.

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Gentlemen:
Please send me technical literature on Silastic Tape.

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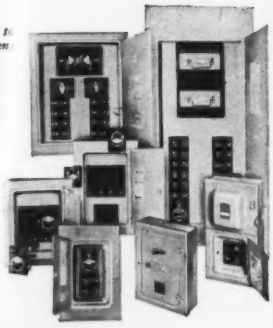
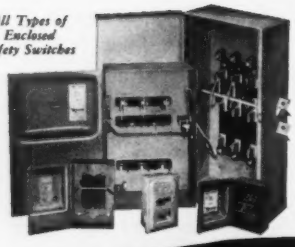
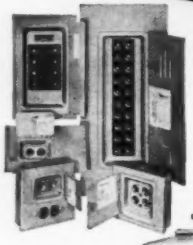
Service Equipment to Meet Every Requirement



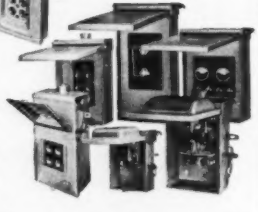
All Types of Enclosed Safety Switches



The General Line is the COMPLETE Line



Extensive Line of Branch Circuit and Residence Panels



A Complete Line of Weatherproof and Raintight Service Equipment and Safety Switches

General makes a complete line of Enclosed Safety Switches, Service Entrance Equipment and Branch-Circuit or Residence Panels—all designed for *greater convenience, better appearance and long trouble-free performance.*

Send for new Catalog No. 5103 and latest price list.

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Elliot 2367

Spokane 8, Washington
Keeler, White Co.
So. 121 Madison St.
Madison 7974

General Switch Corp.
45 Roebling Street Brooklyn 11, N. Y.

Night Light

(20) Curtis Lighting Inc., 6135 W. 65th St., Chicago 38, Ill. Dept. ED-16

For night lighting corridors, halls, lobbies, theaters, stock rooms, stairways, etc., the Glo-Ray uses one 15- or 25-w frosted incandescent lamp. The lamp housing is finished in black enamel, is 4x6 in., requires 3-in. recessing depth. The cover is zinc plated and sold unpainted so that it may be finished in any color.

Feed wires may be inserted at top, bottom or either side of the box and four knockouts are provided.

A shutter arrangement inside the cover controls the amount of light permitted to pass through the cover glass.

Cord Connector Body

(21) Rodale Mfg. Co. Inc., Emmaus, Pa.

A 3-way, 10-amp cord connector body, cataloged 3130, will accommodate both 3-wire and parallel-blade caps. Made of two pieces of molded Bakelite with an armored base and metal cord clamp, the connector has brass contacts, screws and terminals. The armor and cord clamp are coated to resist rust and corrosion. Ample spacing has been provided for wiring. Rating is 10 amp, 250 v and 15 amp, 125 v; cord hole diameter is .500 and body diameter is 1½ in.

Catalog 3230, to be introduced soon, is a 3-wire cord connector body, rated 20 amp, 250 volts, with cord hole diameter of .625 and body diameter of 1¾ in.

For bulletins, fill in coupon on page 61

Utility Executives Endorse Hotpoint's Plan of Action During a Guns and Butter Economy

Geared to the problem of Load-Building and Load-Balancing, Hotpoint's timely program, prepared in chart form, is ready for presentation to utility management.

Operating under a dual economy has presented problems to many businesses, including utilities, which call for a re-appraisal of what we've been doing and a new look at what needs to be done now. In the light of present complex conditions, Hotpoint has prepared a suggested long-range utility promotion program timed for introduction during the period of Defense Mobilization. Those utility executives who have reviewed this program, and the supporting material available for your use, have praised the sound planning that has gone into it. We shall be happy to present it to your organization.

UTILITY DIVISION
Hotpoint Inc.
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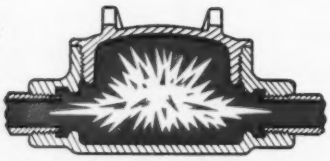
Explosion-Proof CONDULETS*

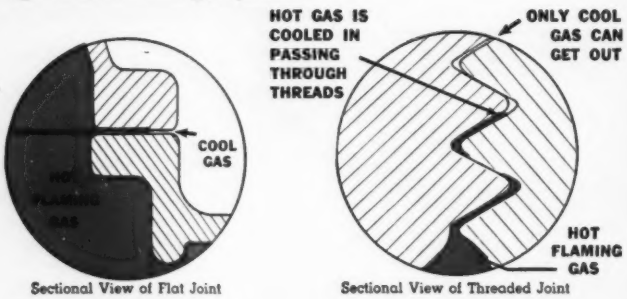
give you PROTECTION where flammable atmospheres are present or likely to be present

. . . because every explosion-proof CONDULET . . .

1 Withstands the force of an internal explosion



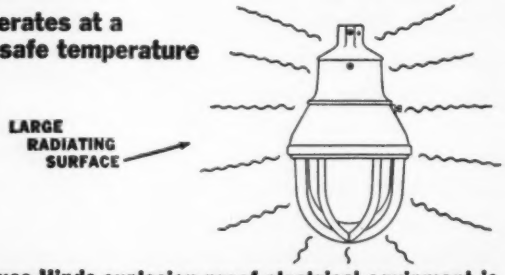
2 Has flametight joints



Sectional View of Flat Joint

Sectional View of Threaded Joint

3 Operates at a safe temperature



All Crouse-Hinds explosion-proof electrical equipment is built to exceed Underwriters' Laboratories requirements.

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CERTIFIED BALLASTS

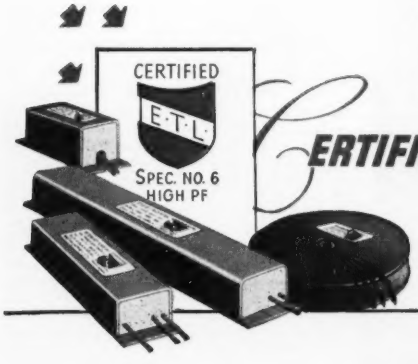
assure a full 100% life for fluorescent tubes!

Tests show that fluorescent lamps last longer when used with a CERTIFIED BALLAST than when connected with an improperly designed ballast.

CERTIFIED BALLASTS assure rated light output, quiet operation and long, satisfactory service. There's a reason for this. It is... CERTIFIED BALLASTS are made to precise specifications, then tested, checked and *certified* by Electrical Testing Laboratories, Inc.

● Complete information on the types of CERTIFIED BALLASTS available from each participating manufacturer may be obtained from Electrical Testing Laboratories, Inc., East End Avenue at 79th Street, New York, New York.

Participation in the CERTIFIED BALLAST program is open to any manufacturer who complies with the requirements of CERTIFIED BALLAST MANUFACTURERS.



CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

magno-tronic

DUAL SILVER POINT — FULLY AUTOMATIC

FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

GUARANTEED — FOR ONE YEAR!

This is a glow switch condenserless precision starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically resets upon interruption of the lamp circuit.

SIMPLIFIES—Replacement of defective lamp automatically recycles starter circuit. No buttons to push—no replacement of starter.

REDUCES COST—Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum possible lamp life.

VERSATILE—Built to operate efficiently over an extended voltage and temperature range.

SP-15-20 For use with 15 or 20 watt lamps.
SP-30-40 For use with 30 or 40 watt lamps.
SP-85-100 For use with 100 watt lamps.

Manufactured under U. S. PATENTS

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When selecting automatic time switches for indoor and outdoor uses remember the advantages of dependable TORK CLOCKS. Ideal for — Signs and Window Lights — Pumping — Defrosting — Oil Burners — Pre-heating — Lead or Wax — Hen House lights. Write today for complete details.

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30 AMP • SINGLE POLE TELECHRON MOTORED

Favorite of our Full Line!

TORK CLOCK CO. INC.
ONE GROVE STREET • MOUNT VERNON • N. Y.

(22) CONTACTOR — A 25-amp industrial contactor has been announced by the R-B-M division of the Essex Wire Corp., Logansport, Ind. The new unit has normally open contacts only; can be furnished with power poles, plus convertible interlocks. It is designed for 600-v a-c maximum; is available in 2- to 5-pole construction, reversing and nonreversing, open and enclosed.

(23) ADAPTERS — Steber Mfg. Co., Broadview, Ill., has added three junction-box-type cluster adapters to its line of Steberlites: No. S-314, a 4-in. round fitting with six tapped openings and blank cover plate to mount up to five lights; S-315, a 3¼-in. round fitting with four tapped openings for clusters of two or three lights; S-316, a 4-in. round fitting with six tapped openings plus tapped cover plate for mounting up to six lights. Type S-316 is said to be particularly adaptable for high-bay pendant mounting of PAR-38 and R-40 sealed-beam lamps. Bulletin 120-51 describes the units.

(24) FAN—A built-in kitchen ventilator, model LC10, has adjustable sleeves to fit various wall thicknesses. Catalog 8151 has an expansion range from 4½ to 6 in. and 8153, from 5¾ to 9 in. The fan delivers certified 500 cfm capacity. Made by Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.

(25) MOTOR—A motor that is a combination brake and drive has been announced by Brown Boveri Corp., 19 Rector St., New York 6, N. Y. It was designed for use where frequent starts and stops are required. No outside power source or special controls are needed for applying or releasing the brake. When power is cut, the motor brakes and stops with 150% of normal torque and without creep or backlash, the manufacturer states. These motors may be mounted horizontally or vertically; are available from .3 to 8 hp in drip proof and .2 to 4 hp totally enclosed models.

(26) COUNTER—General-purpose counting in several variations, including total count, rate of count and predetermined count, is possible with the Post promatic electronic counter. Post Machinery Co. of Beverly, Mass., makes the counter. General Control Co., Boston 34, Mass., handles the sales and manufactures the related controls.

(27) SPOT LIGHT — The Peep Spot 1070RT made by Neo-Ray Products Inc., 315 E. 22nd St., New York 10, N. Y., is relamped from the top, which is secured by spring-action snaps. The unit is designed with maximum shielding. Orifices conform to 35° beam spread.

(28) TIMER—A low-priced electric interval timer for electric and gas ranges has been announced by International Register Co., 2614 W. Washington Blvd., Chicago 12, Ill. A single dial permits settings of ½-minute intervals during the first 15 minutes and 5-minute intervals after 15 minutes.

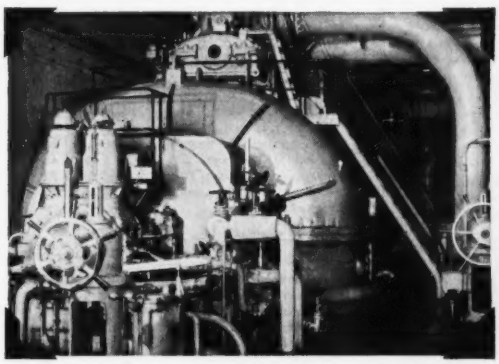
(29) FLAME CONTROL—Flame failure protection and programming control for fully automatic commercial and industrial gas or oil burners is provided by the Fireye system FP-2. Made by Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.

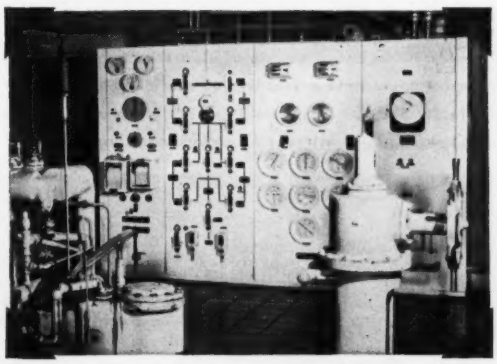
STANDARD ENGINEER'S REPORT

DATA

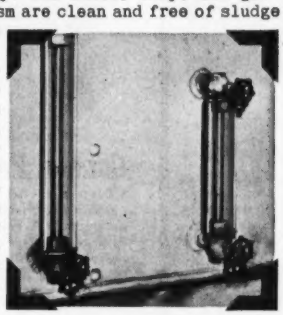
LUBRICANT	Calol OC Turbine Oil-9
UNIT	G.E. 50,000 KW Steam turbine Horizontal steeple compound Steam 1250 lbs-750°F.
PERIOD	6½ years
LOCATION	Station A, San Francisco
FIRM	Pacific Gas + Electric Co.

Oil charge in use 54,000 hours shows no deterioration!

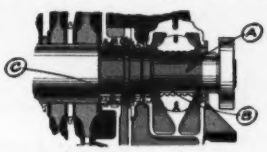




CHARGED WITH CALOL OC TURBINE OIL more than 6 years ago, this turbine-generator has operated continuously for 54,000 hours without re-charging. The oil still filters clear. (Note clearness of oil in filter sight gauges below.) Laboratory analyses show no increase in acidity. Oil lines, sump, and governor-control mechanism are clean and free of sludge and lacquer. Journals indicate no wear. Calol OC Turbine Oil provides a constant lubricating film and is very resistant to both oxidation and corrosion. It will solve your toughest lubrication problems in turbines, hydraulic units, pumps, etc. It comes in several grades to meet many different operating conditions.



How CALOL OC Turbine Oil prevents sludging, rusting and wear



A. Excellent metal-wetting ability keeps CALOL OC Turbine Oil on bearings and gears under the heaviest loads—assures constant lubrication.

B. Oxidation inhibitor resists highest operating temperatures; prevents sludge, gum and lacquer formation on parts and in oil systems.

C. Corrosion inhibitor stops rusting even in initial turbine operation, stops the action of both fresh and salt water.

FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

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STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

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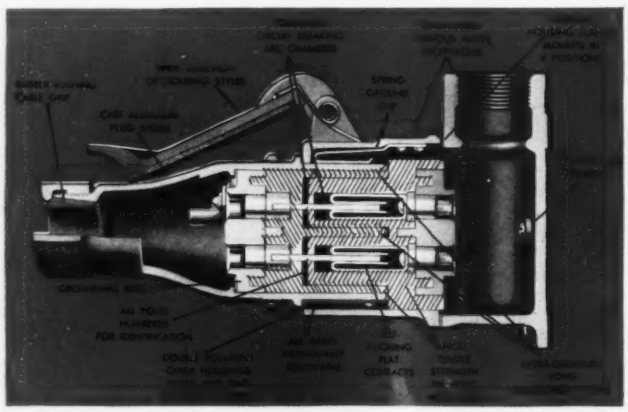
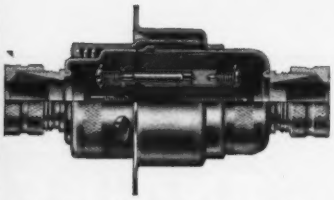
Pyle-National plugs and receptacles are built to withstand the most severe operating conditions, as proven by years of remarkably dependable service in a wide variety of industrial applications. The many substantial construction features of this extensive line of plugs and receptacles and the high quality of materials and workmanship insure safe operation, uninterrupted service and long life.



QuelArc* • *Circuit Breaking Series* Unique partitioned insulation provides long insulated paths through air and across surfaces for exceptional protection in these current rupturing devices. Cast metal housings, high grade insulation and individually renewable contacts insure long service life. Ratings 20, 30, 60, 100 and 200 amperes, 250 volts DC, 600 volts AC—2, 3, and 4 pole—grounded through shell or extra pole. Threaded cap, plain and hinged spring door housing styles are available.



Interchangeable reversible contact units. 1, 2, 3, 4, 6, 8 pole

Triploc* *and Multiple-Circuit Series*

A line of exceptional versatility, unequalled in the heavy duty field, with a virtually unlimited number of assembly combinations for varied applications. Offers a selection of 1, 2, 3, 4, 6 and 8 pole contact units which are interchangeable and reversible in any single set of housings. Many types of housings available of pressed steel with automatic lock and of cast metal threaded for watertight gasket seal. Multi-Circuit housings with 2, 3 and 4 contact units available for combinations up to 32 poles. Ratings 15 and 20 amperes, 250 volts DC, 460 volts AC—circuit breaking. Pressed steel fusible and fuseless plugs measure only 1 13/16" outside diameter.

Midget Triploc* *Series* Same construction features as Triploc except for much smaller outside diameter of plug shell—only 1¼". Interchangeable and reversible contact units—2, 3 and 4 pole—are of the flat blade type. Rated 10 amperes, 250 volts; 15 amperes, 125 volts.

General Purpose *Series* Available with cast metal housings in many types for circuit breaking and disconnect service. 30 amperes, 125 volts DC, 250 volt AC—1, 2, 3, 4, 5 and 6 pole. 60 amperes, 250 and 600 volts—3, 4 and 5 pole. 100 ampere, 250 and 600 volts—2, 3 and 4 pole. Also many special types, fusible and fuseless, for varied applications.

*TRADEMARK REG. U. S. PAT. OFF.

THE PYLE-NATIONAL COMPANY

1364 NORTH KOSTNER AVENUE, CHICAGO 51, ILLINOIS

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PORTLAND 14, OREGON
Shaffer & Nelson
411 Weatherly Building
East 6639

SPOKANE 8, WASH.
Shaffer & Nelson
824 Realty Bldg.
MA 8370

BULLETINS ETC.

(30) CABLE METER AND REEL—In a recent data sheet, Hykon Mfg. Co., 163 E. State St., Alliance, Ohio, describes two additions to its line. The No. 480 cable reel provides for inside coil diameter of 26 in. Coil support members are tubular semicircles 8½ in. in diameter. The reel may be used with or without stand No. 500. The cable meter No. 450, is designed for electric cable, wire rope, etc., from ⅜ to 1½ in. in diameter.

(31) MOTOR CONTROLS—A new addition of its catalog is offered by Allen-Bradley Co., Milwaukee, Wis. This illustrated catalog has 92 pages; includes dimensions and prices.

(32) CIRCUIT BREAKER PANELBOARDS—A 20-page booklet on circuit breaker panelboards for control and protection of lighting, appliances and other power applications and the circuits that supply them is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This booklet describes the manufacturer's line of De-ion breakers in capacities from 10 to 60 amp. The booklet is B-5260.

(33) ATOMIC DEFENSE—"How to prepare Your Plant for Atomic Attack" is the title of a 32-page booklet offered by Walter Kidde & Co. Inc., Dept. A, 675 Main St., Belleville 9, N. J.

(34) POLYVINYL CHLORIDE RESINS—A service bulletin on its Geon Resin 404 has been released by B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, Ohio. This material can be processed without plasticizer.

(35) TEMPERATURE CONVERSION CHART—A chart that can be used to convert temperatures from −70 to +650, either Fahrenheit or Centigrade, is available from Stevens Mfg. Co. Inc., 69 S. Walnut St., Mansfield, Ohio. On the back are listed major types of Stevens thermostats, with their applications and performance characteristics.

(36) FITTINGS—Electrical conduit and cable fittings for all types of raceways are listed in the 64-page bulletin 65, offered by Thomas & Betts Co. Inc., Elizabeth, N. J. All material is grouped according to the raceway it serves, and an illustrated table of contents is a further aid to quick identification. The Underwriters' seal appears beside approved material.

(37) RECORDERS—A new line of running-time recorders is described in bulletin OP1504 from the Bristol Co., Waterbury 20, Conn.

(38) SUSPENDED LIGHT—Pyle-National Co., 1334-98 N. Kostner Ave., Chicago 51, Ill., has issued bulletin 601 on its Anchorlite, a suspended underside and inside illuminator.

(39) PYROMETERS—Two portable models are described in bulletin PPY-1 from Wheelco Instrument Co., 847 W. Harrison St., Chicago 7, Ill. Specifications on thermocouple holders and tips also are included. A separate price sheet lists standard scale ranges.

(40) VOLTAGE REGULATORS—A 12-page bulletin, S351, covers the complete line of standard Stabline automatic voltage regulators made by the Superior Electric Co., Bristol, Conn.

(41) BRUSH CONTROL—Chemicals and techniques for brush and weed control are covered in a bulletin compiled by the Du Pont Co. Included are experience reports of power, telephone and other companies. The bulletin may be secured from Grasselli Chemicals Department, E. I. du Pont de Nemours Co. Inc., Wilmington, Del.

(42) OILERS—A 4-page broadside, series 4900, from Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis., describes and illustrates types of visible automatic oilers. Data are given to aid lubrication and maintenance men in choosing oilers.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after October 1

Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

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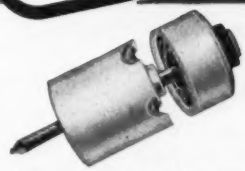
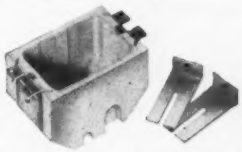
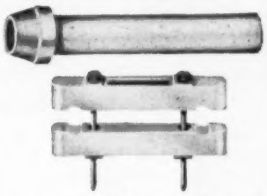


Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.



Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.

Both round and oval type split for-estry insulators as well as telephone insulators are available for immediate delivery.

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FINDLAY, OHIO

ELECTRA'S HUSBAND

"HOW many of the valley water festivals are you going to attend?" Electra asked one evening last month. She caught me when I was half way through a briefcase full of delayed reading I had lugged home from the office.

"What water festivals are you talking about?" I countered with just a little exasperation.

"Why it says here in the *Tribune* that every major community in the Sacramento and San Joaquin valleys from Redding to Bakersfield is going to celebrate the first integrated operation of the initial features of the Central Valley Project during the first ten days in August. The paper says it's 'a major milestone in civilized man's elemental urge to control and utilize the fresh waters of the earth.' It reports too that Secretary of the Interior Chapman will attend some of the celebrations and that maybe even President Truman will be on hand to start the electricity working at the Tracy pumping plant, whatever that is."

"Oh, now I know what you're talking about," I said. "I'm not going to attend any of the water festivals. And it gripes me no end to see how the bureaucratic publicists are beating the drums to build this up as the biggest event in California since the discovery of gold. One would think that the great valleys had been wilderness deserts until just now when the Reclamation Bureau waves its magic wand and CVP water goes to work. The publicity boys ought to be made to eat every pound of raisins and figs that have been grown on irrigated land in the San Joaquin Valley since the first pump started lifting water.

"As long as no one raises any objections, those guys will grab all of the credit. Deac Hendee of the *Wall Street Journal* said the other day that the USBR press agents were painting a picture which would lead the uninformed to think that stupendous effects were immediately at hand and that all of the residents of the Central Valley were about to throw their hats in the air in a hysteria of rescue from a waterless desert."

"Gee, I didn't know you were so burned on this subject or I would not have brought it up," Electra commented.

"The fact that I've just been reading a study on the numbers and activities on the federal press agents, public relations experts and information specialists doesn't add to my appreciation of this latest show," I continued. "If Fulton Lewis thinks there are too many chauffeurs driving cars for federal brass, he ought to look into the numbers and the costs of press agents. It's staggering.

Drum Beaters Busy On Water Festivals

"However, in the case of the Central Valley Project celebration I've been told by one of the boys in the office that the government drum beaters sought outside help to dream up some of the fancy showmanship to go with the transfer of water from the Sacramento to the San Joaquin watershed. Some of the ideas proposed were in the realm of pure fantasy. For instance it was suggested that they get Esther Williams to swim down the Sacramento ahead of the water released from Shasta Dam."

"Now nobody would dream up a silly idea like that," Electra interrupted.

"You don't know publicity men," I said. "Then there was another suggestion that colored dye be put in the water so that it would be recognized when it reached the intake of the Tracy pumping plant some ten days later. That fizzled because the color would be so diluted by that time that it would be indistinguishable. They did settle on floating some barrels of water from Shasta Lake down the river, timing the arrival so that a barrel can be hauled out at each town where a celebration is scheduled. They can carry those in trucks just like they do fish. Otherwise they will have to send a boat along to keep the barrels off the sand bars and banks of the river. Besides somebody might think they contained liquid more palatable than water."

"You're kidding me," Electra said. "No government department would go in for that sort of stuff."

"That's what you think," I explained. "Of course there has been a lot of critical comment. One of the Congressmen asked for an investigation of the whole publicity program of the bureau in connection with the celebration. He threatened to take away appropriations if any money was being misspent.

"One other thing the press agents did that backfired was to broadcast the news of the forthcoming celebrations to newspapers all over the country. Some of them didn't like it. There is a clipping of an editorial from a paper down in Columbus, Ga., here in this pile that blasts the bureau. Let me find it and read you a couple of extracts.

"Here it is," I said after rummaging through the pile of papers on the table. "The editor tells about getting a mailing tube from the bureau in Sacramento which contained pictures, a map, a 1,500-word publicity release and a lot of filler items. Here are some of the things he says:

" 'The cartoon map, of little if any interest in Columbus, Ga. (although possibly of great interest to Communists inasmuch as it pinpoints the Central Valley's entire system of dams, reservoirs, etc.), would require almost a full news page for clear reproduction.

" 'The press and radio release was too ridiculously long for any consideration by any newspaper or radio broadcaster and was loaded with "propaganda" compliments to the bureau in general.

" 'None of the other press release material is of any use whastoever . . . "The Central Valley water festival—most colorful celebration in California history—will play to an all-star cast," the release shouts breathlessly . . .

" 'As thrilling as this sounds we are left unimpressed in view of the cost of the propaganda and the questionable right of the bureau to spend our tax money for such purposes . . .

" 'We don't like it.' "

"Apparently you don't either," Electra said with finality.

TAP CHANGER Operated Above Oil Level

NOW STANDARD

ALLIS-CHALMERS
DISTRIBUTION TRANSFORMERS

THIS NEW tap changer has its operating handle and indicating dial plate extended *above the hot oil level* for convenience in changing taps. It's easy to operate, easy to read and requires no maintenance. Attractive and compact, the design is based on the sturdy construction features that have given Allis-Chalmers tap changers top performance for many years.

Bold white letters mark tap positions on a black vulcanized fiber dial plate. Cautioning area indicates the location of limiting stops.

As the molded plastic assembly is turned, the high pressure contact snaps into position with a wiping action. The contact shoe is V-shaped so that it makes a positive stop in a position bridging two studs.

You can get Allis-Chalmers *new* long handled internally operated tap changer in distribution transformers rated 100 kva and smaller single phase; 150 kva and smaller three phase. For more information contact your local Allis-Chalmers sales office or write Allis-Chalmers, Milwaukee 1, Wis.

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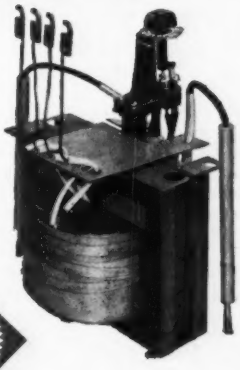

Leads are firmly crimped to tap changer studs for a lifetime connection.

ALLIS-CHALMERS A-C ALLIS CHALMERS

engineered to meet defense production needs

for higher lighting levels at lower maintenance and operation costs

One of today's most important defense production lighting problems is not only *how to get* HIGH LIGHTING LEVELS economically, but also, *how to sustain them* economically, year after year. Benjamin's answer is "MAGNA-FLO". This new lighting system, by utilizing the new, high light-output efficiency T12 Slimline Lamps, provides higher light output more efficiently, more ECONOMICALLY, than any other Benjamin-built fluorescent unit.

Furthermore, with "Magna-Flo" you are assured that this high light-output efficiency of the T12 lamp is SUSTAINED ECONOMICALLY, year after year. Porcelain Enameled reflecting surfaces sustain this efficiency by maintaining original high reflectivity with occasional soap-and-water cleaning. "Springlox" Lampholders sustain efficiency by facilitating maintenance of the reflector and the lamps themselves. Benjamin "Battleship" construction, utilizing extra-heavy gauge reflector steel, sustains efficiency by preventing sag, distortion and breakage.

FREE "MAGNA-FLO" BULLETIN brings you complete data about this most modern, efficient way to get HIGHER LIGHTING LEVELS at lower cost . . . write for your free copy TODAY! BENJAMIN ELECTRIC MFG. CO., Dept. J , Des Plaines, Ill.

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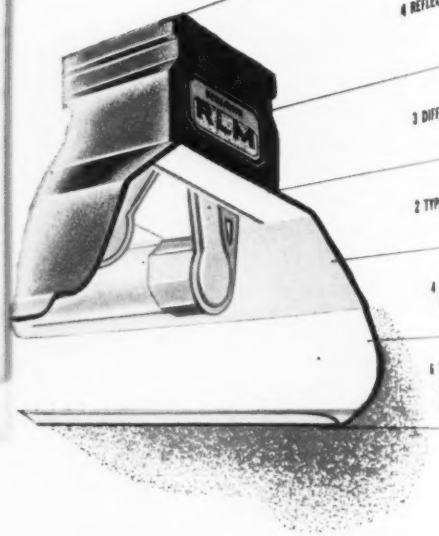

4 REFLECTOR STYLES	OPEN-END	CLOSED-END	OPEN-END WITH APERTURES	CLOSED-END WITH APERTURES		
3 DIFFERENT SIZES	48"	72"	96"			
2 TYPES OF UNITS	INDIVIDUAL	CONTINUOUS LINES				
4 IMPORTANT ACCESSORIES	LOUVERS	PLASTIC COVERS	GLASS COVERS	LONGITUDINAL SHIELDS		
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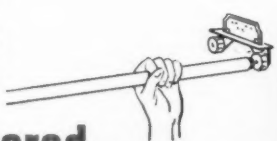
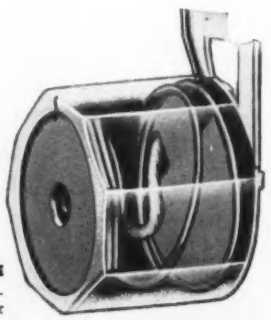
ON THE NEW, HIGHER-EFFICIENCY, INSTANT-START T12 SLIMLINE LAMPS! "Magna-Flo" Units are available in a wide range of systems for nearly all industrial seeing requirements. Open or closed-end diffuser-type reflectors are available. Apertures in these reflectors direct 5% of light upward for greater seeing comfort.





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AND OPERATING COSTS! *Exclusive "SPRINGLOX" Lampholders,* by simplifying re-lamping, facilitate reflector cleaning and maintenance. They make possible fast, one-hand lamp insertion, and assurance against lamps working loose or dropping out.

50 BENJAMIN FIFTY YEARS OF PROGRESS

B-35625

AUGUST 1951 Vol. 107, No. 2

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

OPERATING IN A WAR ECONOMY

HAROLD QUINTON*

Executive Vice-president, Southern California Edison Co.

As employees of enterprises dedicated to the manufacture and delivery of electricity, and of the various mechanical devices and equipment related thereto, and the construction thereof—it is our task to make such contribution to our nation's strength as is possible within the area of responsibility that is left to private enterprise.

What, then, can we as administrators in the electric contractor, supplier, and utility field expect to find in the indefinite period ahead?

Among the first factors is—*inflation.* Although the relaxation of the Federal Reserve Board's policy concerning the government bond market may seem to lend encouragement to anti-inflation hopes, we must expect more inflation. We must expect more inflation so long as our national leaders claim to fight inflation while sponsoring price supports, artificially low interest rates, excess profits taxes, unsound government loans, and public works projects that are not self-liquidating. Either the ignorance—or the hypocrisy—of such politicians is exposed by the tremendous expenditures, unrelated to defense, which contribute to the worst inflationary device—deficit spending and monetization of the resulting debt by the federal government.

Since none of the companies we represent operates in a vacuum, it is unrealistic to consider the effects of inflation on our companies without considering the destruction it inflicts upon our national economy.

One of the many subtle workings of inflation *can be* aired by describing its effect on any one of our companies.

Although inflation erodes the accumulated capital of *all* industries, its effects are perhaps more important in regulated industry.

As our plant is used up in providing service, it is vital that provision be made from earnings to replace it.

Since, however, our rate of return and charges are related to original cost (rather than replacement costs which average almost 100% higher) it is impossible to replace from earnings the capital being consumed in our operations. Accounting practices reveal a part of this fact, but not all of it; and we are accumulating undetermined deficits and reporting earnings at a much higher figure than they actually are in relation to replacement costs.

Thus it is, in all industries to a greater or lesser extent, that inflation weakens their foundations by eroding the asset values accumulated over past years.

While we must continue to meet the demands of defense mobilization—and although this requires the continued expansion of plant capacity in our enterprises—it is incumbent upon us to avoid needless and wasteful construction programs. If I may be permitted to quote from the 1950 Annual Report of the company I represent, it may emphasize our responsibility to establish true, austerity budgets:

"Increased efficiencies of the company's newer plants and facilities, temporary lower fuel prices, lower maintenance expense, and less purchased power, resulted in substantial savings during the year compared with 1949, but all of this was more than offset by increased taxes, depreciation and other operating expenses, so that less than 10% of the increase in gross revenue in 1950 was reflected in gross income.

"It is particularly significant that gross income increased only $407,187 in the year 1950, during which period an average of approximately $20 million of new capital was employed in the business.

"Stated in another way, the company realized a gain of only $407,187, *or a return of only 2%* on $20 million of new capital . . . which return is less than one-half the cost of such new capital . . .

"The statement demonstrates the important point . . . that present-day plant costs and the attendant excessive new money required, and its costs, are a burden and disadvantage far outweighing the deceptive advantages of comparatively low quoted money rates."

One of the most difficult problems facing management is that of drafting and executing a realistic plant construction program. The postwar spending spree has erased any base line we might have had for estimating future demand for our services.

Now we have the added complication of increased military demands. In formulating expansion programs it would be wise to look beyond the short-term factors which would seem to encourage reckless expansions, and to take a longer range view of the total picture.

For those of us familiar with the aggressive campaign to socialize the electric industry, the second factor to be faced in the "war economy" comes as no surprise. We can expect the needs of defense mobilization to be exploited in furthering the federal government's electric empire.

Mr. Truman's budget for 1952 contains requests for almost $1 billion for the government's electric power program.

If the bureaus involved in this vast program have followed their past

* Based upon an address before the Administrative Service Section, PCEA, Los Angeles, May 21, 1951.

record of grossly underestimating the costs of proposed projects, these new facilities will cost more nearly $2 billion.

As you know, these projects are just *part* of the government's power program which is being pushed onto the country in the name of national defense.

Just recently the House Appropriations Committee severely criticized the Bureau of Reclamation for trying to establish, contrary to Congressional direction, a California-Oregon transmission line—the Central Valley-Bonneville tie. Such a line would be a big step in the long-planned scheme to impose a federal electric grid upon our nation.

The Department of Interior's request for $559 million was cut in the House to $497 million. Even this limited reduction will be attacked in the Senate. Those who have long sought to socialize the electric industry will not be diverted from their program—even by the imperative need to reduce government spending to an absolute minimum. Furthermore, the limited cut in the House offers little encouragement that there is any real disposition in the Congress to challenge the socialist campaign to establish government domination, and finally ownership of the electric industry.

Is Industry Problem

If anyone here thinks that this is a problem solely for the electric utilities, consider, if you will, the position suppliers and contractors would be in if the government should become the sole buyer of electric facilities and equipment.

First, no competition would exist on the demand side of the market. A monopoly of demand could ruin every supplier.

Second, would not the thought grow that since government is the sole buyer of such supplies, it should undertake to be its own supplier?

The third factor that comes to mind involves controls—controls over credit, prices, wages, materials, and production. As the mobilization program develops, with inflation continuing, we can expect government to assume more and more control over our economy. Since political rather than economic considerations direct most government interferences with our economy, no realistic forecast of the scope and nature of such controls can be made.

While our World War II experiences with red tape, priorities, allocations, and dislocations may aid in meeting forthcoming difficulties, it is certain that our plans for the enterprises we represent must be kept flexible—both operation- and capital-wise.

Our jobs will be to recover from the imposed and recurring unbalances that will result from government domination of our economy. At the same time that our markets are being altered and disrupted, our manpower shifted and drained, our capital sources taxed and strained, we must meet defense needs.

Austerity Will Result

And, if we are to discharge our responsibilities as managers, we must also prepare our companies to the best of our abilities for the period of austerity that inevitably—sooner or later—will result from controls and inflation.

Although realistic enough to foresee the approach of controls and the confusion resulting therefrom, many of us entertained the hope that no added dislocations would be foisted on our country through the use of controls as a means of furthering the government's power program.

Last year Secretary of Interior Chapman said, "I give you my solemn word that as Administrator of the Defense Power Administration I shall take no action with the intention of giving one segment of the electric power industry advantage over the other. I shall not use the defense powers entrusted to me as a means of advancing public power development at the expense of private power development."

We have already reviewed the requests relating to power in the President's budget for 1952. We now know of Mr. Chapman's decision to free the requests of REA cooperatives for scarce materials from the red tape procedure required of private companies.

Although our requests for such materials must be placed with, and processed by the Defense Electric Power Administration, those of REA co-ops will be processed by the REA itself, from lump allocations made to it by the DEPA.

Over and beyond the longer term considerations that may be indicated by such favoritism, the immediate effect no doubt will be to increase the difficulties the electric industry will have in procuring the materials needed in their construction programs.

But the use of controls in a questionable manner involves a picture broader than merely the utility industry. It strengthens the suspicion, born of experience in World War II, that controls are pushed by some groups—not because of their understanding of the needs of defense mobilization, but because of their traitorous desire to establish in peace as well as in war, a regimented society in America.

The last factor in our so-called "war economy" I wish to discuss is the manpower situation. Director of Defense Mobilization Wilson has expressed the hope that we won't need compulsory manpower controls like those of World War II. But we can expect to lose many valuable employees to the military services and to newly created defense agencies. Prompt and realistic training and recruitment programs may alleviate some of the difficulties brought about by the conscription of our personnel.

A greater threat, however, to the security of our country lies in another direction. The maneuvering of union labor leaders to procure for themselves greater power over the economy forebodes critical labor relations for many industries. Their hold over the administration, developing as it has for nearly 20 years, has reached the point where the President of the United States sabotages his own control agencies under the pressure of labor opportunists.

Responsibilities Will Multiply

We have witnessed the recent creation of two new agencies. Labor union leaders applied the pressure which brought these agencies into being. Both the National Advisory Board on Mobilization Policy and the new Wage Stabilization Board will provide stimulus to the growth of a socialist-labor government in America.

As the crisis deepens, as mobilization is speeded, as union labor leaders demand more and more control of American labor, American business, and the American people—as these things occur—we can expect the decline of collective bargaining to continue. That is to say we can expect the demands of labor bosses to come forth in the guise of governmental directives.

Opposition to such directives, exposes citizens to attack for "unpatriotic hinderance of the defense effort." Thus, we can expect the responsibilities of management to multiply, while our freedom to meet those responsibilities is being drained away.

We cannot shirk our duties because their performance is made more difficult. We must stand ready to make decisions in the area of responsibility left to us.

We must be alert to our duties until the final source of control awakens to its responsibility and becomes aware of its power—until the American con-

sumers, the American people, call a halt to the campaign of those who would control them. For, in the final analysis, the controls on credit, prices, wages, production—and manpower—are controls on consumers.

Prior to World War II, we had abandoned to an alarming degree the economic system which was the foundation of our nation's strength. During the war the planned economy made further inroads. Much of the freedom surrendered during World War II was not returned. Since Korea we have surrendered even more of our freedom; and yet we think we are more secure!

Our military leaders have estimated that the present *"period of tension"* will last from 10 to 20 years. Even if the Korean "incident" were to end tomorrow, the American people are going to be met with a very hard, a very stern reality.

The only known economic system which can function, and still permit man to be free, is under attack—assaulted from within. Inflation is feeding upon itself, and despite words to the contrary, we know that it is being deliberately courted by demagogues possessing unparalleled power over us.

A billion dependents (whom we refer to as our "allies") look to us to save them from their own economic follies and to protect them from the threat of an ideology (communism) which is of the same breed as the ideology that they voluntarily embrace (socialism).

Every one of the frequently recurring crises has been used to goad unthinking people into abandoning more and more of their freedom.

Our political leaders have committed our country to obligations which would sorely test a sound economy, much less one riddled with socialistic flaws. Arrogant bureaucrats and politicians are periodically exposed in such violations of honesty and trust, that only an immoral or tragically apathetic people could tolerate their continuance in office.

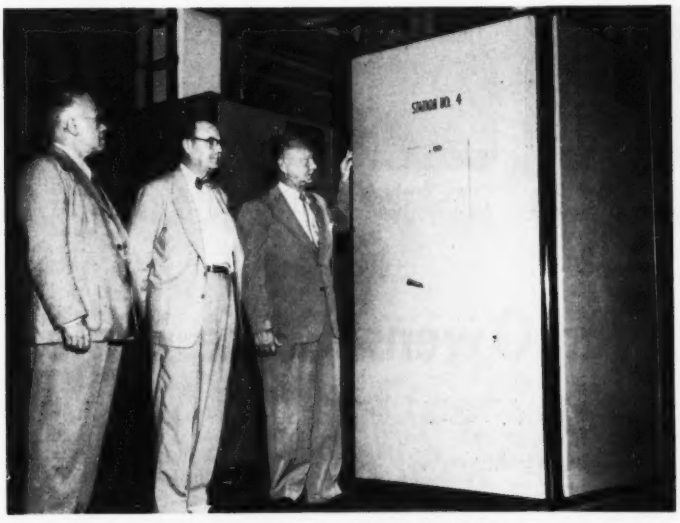
And we still talk of prosperity and maintaining or even increasing our standard of living!

The danger to those institutions we refer to as "the American Way of Life" is multiplied as the duration of the "period of tension" is lengthened. Business managers are human—that might shock some quarters! But, being human, this means that they too are susceptible to the conditioning process of submission to long-continued domination.

Where responsibility, decision-making, and the exercise of judgment have been relinquished by "the many" to "the few," the likelihood of reacquiring these functions diminishes with the passage of time. "The many" come to look upon those functions as burdens as their talent for performing them declines through nonuse. "The few" become more jealous of their power the longer they exercise it.

And so, may I repeat the message I have tried to bring you. And it is thus:

In the critical period ahead, let us be sure that no area of decision passes to government because of any failure on our part to accept responsibility, to make judgments, and to act wherever we have the freedom to act.



Shown here left to right are W. A. Howe, Pacific Coast district manager, Westinghouse engineering service division; C. H. McAllister, Honolulu sales engineer for Westinghouse; and Harry D. Jefferson, Hawaiian Pineapple Co. electrical engineer

Capacitors Effect Large Savings

Capacitors purchased in 1938 at a cost of $8,640 saved the Hawaiian Pineapple Co. $57,933 in 11½ years, with an average yearly saving of $5,037. By increasing its total investment in capacitors to $10,835 fifteen months ago, the world's largest cannery now is realizing a saving of $8,660 a year.

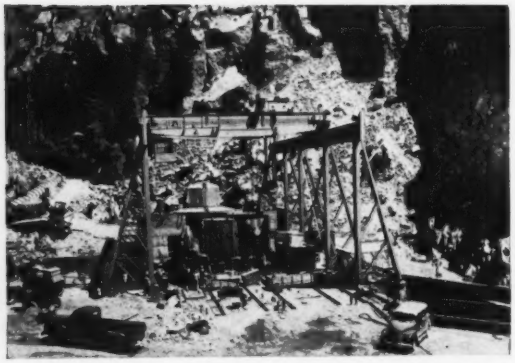
This impressive saving in power cost was made possible by installation of 1,180 kva of Westinghouse capacitors in 1938 and 450 kva in June of this year. Use of capacitors provided sufficient reactive kva to raise the power factor to 98.5%. The Hawaiian Electric Co., from whom the large Honolulu cannery obtains power, allows 1% reduction in demand charge for each 1% increase in power factor correction above 85%.

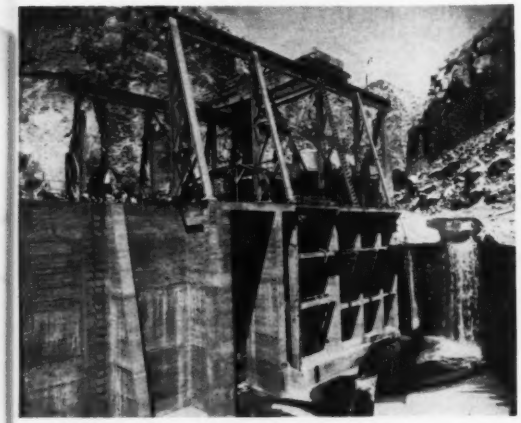
Recently a modern Westinghouse distribution system was completed throughout the highly mechanized plant.

The new system consists of two supply lines with one central control panel, and decentralized transformers located near dense load centers. Both supply lines have automatic transfer facilities, and either can handle the full load. Metal-clad switchgear has an interrupting capacity of 500,000 kva and consists of two supply panels, one metering panel and three feeder panels. Fifteen air-cooled 300-kva transformers feed nearby equipment with a minimum of secondary circuits.

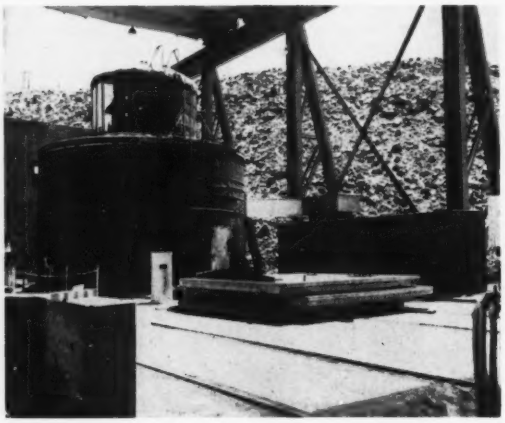
Primary feeders requiring 14,000 ft of 3½-in. conduit serve the 15 load centers with fully convertible 440-v breaker panels and one 937-kva bank with 2.4 kv circuit breakers for lighting circuits. These circuits supply 45 25-kva air-cooled 2,400/120/208-v transformers.

Controls for all three 37,500-kva Owens Gorge plants will be from Plant 3 shown at left. Two systems of control governing all necessary functions will be used. Plant 2 at right will operate under a head of 757 ft. Head on Plant 3 is 760 ft





Completely boxed in concrete afterbay chamber at Plant 2 is shown at left. Turbine discharges through checkerwork at right.



Tunnel intake for Plant 3 is the rectangular opening shown. Right view shows 37,000-kva outdoor-type generator and crane

Outdoor Plants for Owens Gorge Project

Three single-generator Los Angeles city plants totaling 112,500 kva are nearing completion

An interesting hydro development by the Los Angeles Department of Water & Power is nearing completion in the gorge section of the Owens River, a short distance north of Bishop, Calif. Three identical plants, so far as major features, are being built to utilize 2,259 ft of effective head in a 15-mile section of the gorge. Each will have a Pelton 51,200-hp, 400-rpm turbine driving a 37,500-kva, Westinghouse outdoor-type generator. The plants are numbered 1, 2, 3, down the river. Water for plant 1 is diverted by a low dam, and by tunnel and penstock is dropped to the plant under a net effective head of 742 ft. Tailrace water discharges immediately into a concrete afterbay chamber, from which it is conveyed, via tunnel and penstock, to Plant 2 to give that plant a net effective head of 757 ft. The process is repeated for Plant 3, which has a net effective head of 760 ft. In this process there is involved a total length of 55,000 ft of tunnels and 18,200 ft of penstocks. Penstocks vary in diameter from 106 to 92 in. and in thickness from $\frac{3}{8}$ to $1\frac{1}{16}$ in.

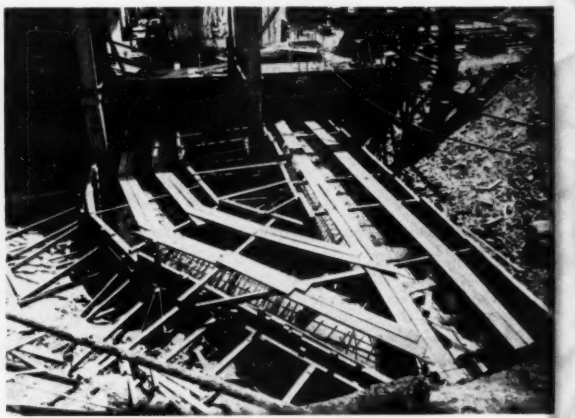
Outdoor Plants

A striking feature is that all of the 18,200 ft of penstock, with the exception of the relatively short sections that drop down to the plants, run across the mesa with the appearance of a large steel pipe flow line. This may be seen in one of the accompanying staff photographs.

On the inside of the pipe is a $\frac{8}{32}$-in. mastic coating put on by the fabrica-

Penstocks look strange running across the desert. There are 18,200 ft of penstock and 55,000 ft of tunnel involved in utilizing the 2,259 ft of head on the Gorge plants. Penstock diameter varies from 106 to 92 in.; thickness, 3/8 to 1 1/16 in.

Continuous buried ground wire (left) connects steel transmission towers. This, together with two overhead ground wires, forms counterpoise for lightning protection. Right: Penstock branches, one branch going to synchronous by-pass valve



tor, to reduce friction head loss to a minimum. The overlap joints are being field welded electrically. Penstock capacity is 625 to 690 cfs.

The plants, as illustrated, are of the outdoor type for economy in building cost. Only the control room is enclosed. Each turbine has a Pelton butterfly valve, a Pelton relief valve and a Pelton synchronous by-pass around the turbine. The synchronous by-pass valve is servomechanism operated from the governor to maintain a constant flow of water between plants regardless of load on the turbines.

Remote Control

Power Plants 1 and 2 will be operated from Plant 3. There will be two systems for control of each of these plants. One will be supervisory and will be used for selective metering, alarms and for controls that will not have to receive continuous attention. The other system will be direct wire, for continuous metering and for controls that will require frequent adjustment. Thus, Plants 1 and 2 will require a minimum of attendance.

A single-circuit 230-kv steel tower, 954,000-cir-mil ACSR transmission line extends 258 miles from Plant 1 to Los Angeles. It is planned later to apply series compensation to this line to increase its carrying capacity.

Lightning protection is similar to that used on the city's 287,500-kv Hoover Dam transmission lines. Two overhead ground wires and a continuous buried ground cable between towers constitute a counterpoise system. This is considered the most effective lightning protection that can be applied to a transmission line.

The 11,500-v generator leads at each plant are carried directly to the low side of the 10,000/12,000-kva, single-phase Westinghouse step-up transformers. On the high side there is a 230-kv pneumatically operated Kelman OCB with interrupting capacity of 2.5 million kva. Westinghouse lightning arresters and 230-kv disconnects complete the high tension structure. In the control room there is an automatic oscillograph and supervisory control equipment in addition to the conventional boards, instruments and controls.

Completion Delayed

The Owens Gorge plants were to have been in operation by now but there have been unavoidable delays in penstock construction. Plant 3, the furtherest along, is now ready for water but it appears that it will be late this year before it can be placed in operation.

Fig. 1, 2 — Aluminum lines differ little in appearance from copper lines. One at right has No. 4 ACSR primary, 1/10 WP secondary

Aluminum Conductor for Distribution

H. C. Purcell
System Design Engineer
Sacramento Municipal Utility District

During the first six months of 1951, the Sacramento Municipal Utility District purchased only 3,000 lb of copper for use as overhead line conductor. In its stead, aluminum is being used at the rate of 500,000 lb per year. This quantity of aluminum, costing $165,000, replaces 750,000 lb of copper conductors which would cost $265,000.

SMUD's first use of aluminum conductors was in 1947 when No. 6 and No. 4 ACSR were installed on rural distribution lines. Since that time, other sizes and types of aluminum conductors have been added, the most recent being No. 2 and No. 1/0 weatherproof aluminum added in September 1950. Table I lists the conductors now being used for overhead line construction. The only copper items are No. 4/0 and 500 mcm copper for heavy services, which are so seldom used that copper purchased several years ago is still on hand. Al-

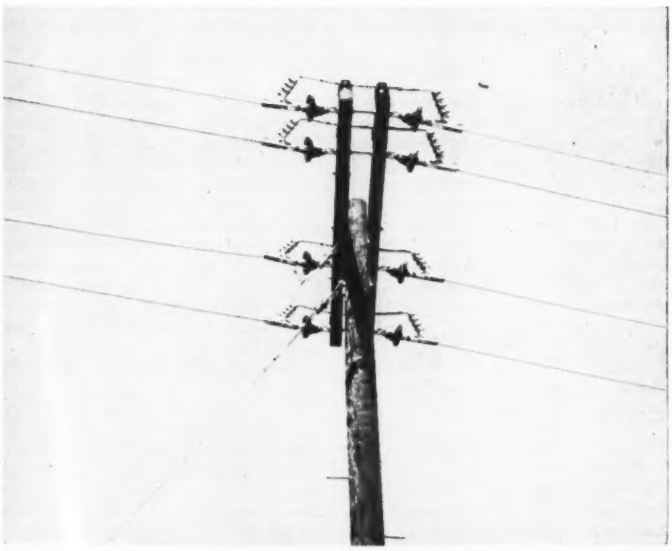


Fig. 3—Transmission dead-end clamps unsuitable for use on aluminum distribution lines

Table I—Conductors for Overhead Lines Used

Bare Conductors

Size	Use
6 ACSR	short 4- and 12-kv taps
4 ACSR	4-, 12-, and 23-kv taps
1/0 ACSR	4-kv main neutrals, 69-kv taps
4/0 ACSR	4-, 12-, 23-, and 69-kv mains

Weatherproof Conductors

4 alum.	services
2 alum.	services, secondary neutrals
1/0 alum.	services, secondaries
4/0 alum.	services
4/0 copper	services
500 mcm copper	services

Table II—Comparative Installed Costs 12-kv Tap to Agricultural Pump

	Copper	Aluminum
Poles and fixtures	$ 559	$ 559
Transformer and cutout	231	231
4-kv wire and fittings	70	69
Secondary wire and fittings	251	220
Services	431	378
Total	$1,542	$1,457
Per cent of copper cost	100%	95%

Table III—Comparative Installed Costs 4-kv Distribution to 24 Homes

	Copper	Aluminum
Poles and fixtures	$305	$260
Transformers and cutouts	359	359
12-kv wire and fittings	191	159
Service	12	10
Total	$867	$788
Per cent of copper cost	100%	91%

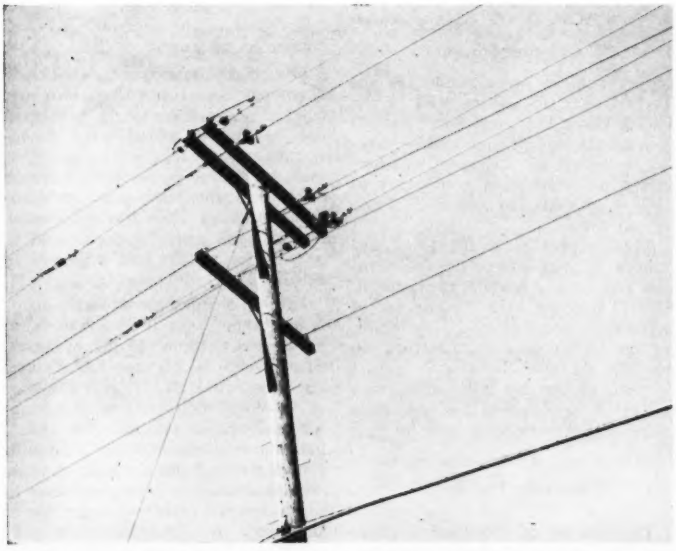


Fig. 4—Loop dead-end is used for 1/0 and a substation strain clamp for 4/0 aluminum

though all bare conductors listed are ACSR, consideration is now being given to the use of No. 1/0 and No. 4/0 bare aluminum where spans are limited in length and full advantage cannot be taken of ACSR's high strength-to-weight ratio.

Economics of Aluminum Conductor

To illustrate the economics which led to this widespread use of aluminum, Table II shows the comparative installed costs of a typical 12-kv tap, 1,200 ft long, to an agricultural pump installation. Similarly, Table III compares line costs in a typical block of 24 homes. Accompanying photographs show lines similar to these hypothetical cases. In Fig. 1 is shown an old copper line to a farmhouse and pump (the short spans on the left) which was extended recently with No. 6 ACSR (the long spans on the right). Fig. 2 illustrates a typical subdivision with No. 4 ACSR primary, No. 1/0 weatherproof aluminum secondary, and No. 4 weatherproof aluminum services.

Illustrated in Figs. 1 and 2 also is the fact that light aluminum distribution lines differ very little in appearance from similar lines with copper conductors. In rural line construction the long spans make the ACSR lines stand out. Where spans cannot be stretched out, as in the subdivision, close inspection is required to distinguish an aluminum line from one of copper. The same general type of accessories are used—split-bolt and parallel-groove connectors, snail and loop dead-end clamps, compression splices, annealed tie wire etc. The only real difference is in the material of which they are made.

Synthetic Covering Preferred

There are other important differences, however. For one thing, aluminum must be handled somewhat more carefully than copper. In addition to being softer, aluminum is "sticky" and has a tendency to seize and be severely abraded when drawn against hard objects, as against an insulator pin when stringing around a slight angle.

As a weatherproof covering for aluminum conductors, URC weatherproofing (the conventional asphalt-saturated cotton braid) is not entirely satisfactory. It is very difficult to remove the covering without removing much of the aluminum as well. The free-stripping weatherproof coverings, polyethylene and neoprene, are much more satisfactory in this respect. Incidentally, SMUD prefers polyethylene

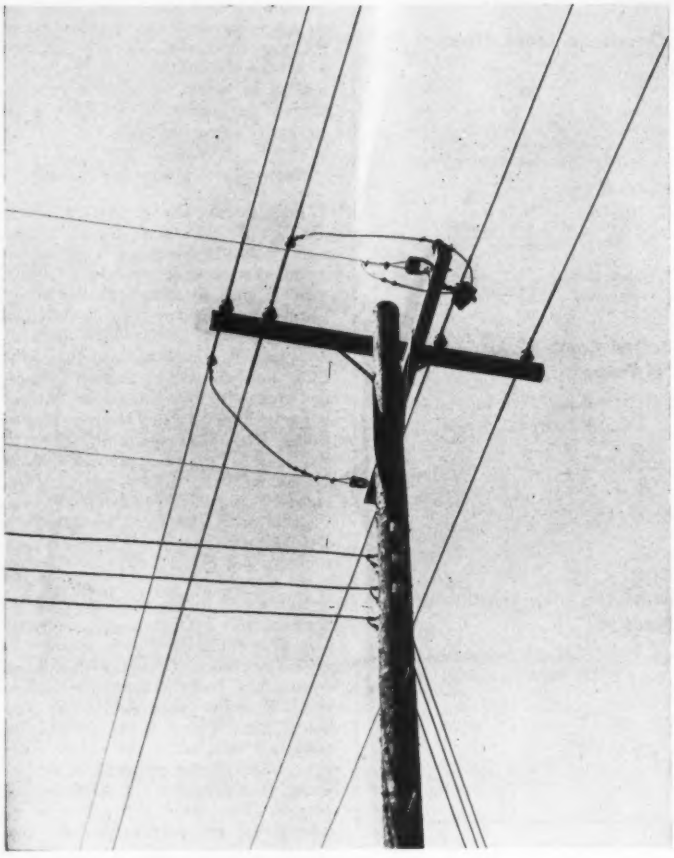


Fig. 5—Connectors unavailable for range from No. 4 ACSR to 4/0 ACSR conductor

because it has demonstrated far greater resistance to abrasion by trees than either neoprene or URC.

Because of its light weight and because it is often installed in spans longer than are usual for copper, linemen with long experience in the use of copper tend to undersag aluminum in hot weather, subjecting it to excessively high tensions when colder weather appears. The few cases of aluminum conductor failure that have been experienced occurred in winter and were caused by too high an initial stringing tension under high ambient temperature conditions. Constant vigilance is necessary by supervisory personnel to insure observance of sag charts. The matter of sag charts for weatherproof, all-aluminum conductor used in urban distribution should receive more study by manufacturers and by the utility industry. At present, there appears to be little agreement in practice and this would be a very proper field of investigation for the T&D Committee of the EEI or the Pacific Coast Electrical Assn. SMUD is in a light loading area and its practice is based on stringing weatherproof, all-aluminum conductor at 25% of ultimate strength at 25°F, no ice, no wind.

Another problem in the use of aluminum is that of proper preparation and care in making connections. SMUD practice calls for the use of petrolatum or other oxidation inhibitor on all connections. Linemen do not like the stuff because it smears up their gloves. No fully satisfactory means of application has yet been found and there is room here for new ideas.

Accessory Problems

The matter of electrical connections for aluminum and copper has been investigated to a limited extent in recent years, but much work remains to be done. At present, there is even disagreement among the various investigators on such fundamental points as what metal makes the best connector body and whether connectors should be dry or greased. This same lack of sufficient development work applies to other conductor fittings in addition to connectors. It is one of the principal reasons why aluminum is not more widely used for distribution. The fittings available may be satisfactory for transmission lines, but all do not adapt well to distribution use. For example, Fig. 3 shows a 4-kv double dead end with conventional crow's-foot strain clamps on No. 1/0 and No. 4/0 ACSR. These clamps will certainly hold the conductor, but they are much too large and cumbersome for distribution work. Illustrated in Fig. 4 is a later dead end of the same sizes of ACSR, using loop dead-end clamps for the the 1/0, and for the 4/0 a type of strain clamp ordinarily used only for tension buses in substations. The latter is an improvement in that it is smaller but it is still heavy and clumsy compared with an automatic dead end for 2/0 copper.

As another specific example of the lack of satisfactory fittings, Fig. 5 shows a tap from a 4/0-1/0 ACSR main 4-kv feeder to a No. 4 ACSR lateral. There are no connectors available that will cover the range from No. 4 ACSR to 1/0 or 4/0 ACSR with armor. Therefore, the tap must be made by connecting in an intermediate size of conductor, in this case No. 1/0 ACSR in the neutral and No. 2 copper to the cutout.

One of the principal objections to changing from copper to aluminum conductors is that to do so almost doubles the number of items of conductors and conductor fittings that must be carried in stock. In addition to the new aluminum items, substantial stocks of the previously used copper items must be maintained to provide for repairs and additions to existing lines.

In spite of the many obstacles mentioned above, the use of aluminum for distribution lines is advantageous. The savings which may be realized are substantial. In many cases, because of its light weight, aluminum is actually easier to handle and install than the equivalent copper. The difficulties arising from the lack of satisfactory fittings will be overcome in time when the rapidly growing use of aluminum in distribution line construction creates a strong demand for new accessories.

Fallacies of Right-of-Way Valuation Theory

George L. Schmutz*

Rights-of-Way most generally sought by electric and gas utility companies are perpetual easements for the construction, operation and maintenance of electric power transmission lines on the surface of the land, and for gas transmission pipe lines beneath the surface. The valuation of such an easement involves more computations than those necessary in the most commonly encountered kind of appraisal. This is for the reason that, almost invariably, the easement is only a part of all of the property in the ownership. In condemnation the acquisition generally is a partial taking, that is, the taking of some but not all of the rights of the owner.

Estimating Easement Value

Thus, the value of an easement may be estimated by either of two common methods: one by a valuation of the fee title in the larger parcel—the entire ownership—before the imposition of the easement, and a valuation of the remainder larger parcel after the easement rights have been taken. The difference is the total amount of the just compensation to be paid for the easement. It is the amount of the shrinkage in the value of the owner's property which is caused by the imposition of the easement.

A second method involves the estimation of the value of the easement, and also the damage to the remainder property outside of the easement area, if any, which may arise by reason of the taking and the construction of the improvement in the manner proposed. The latter is called the "severance damage."

In some states, for example California, these two estimates are required by the Code of Civil Procedure, Section 1248, which reads as follows:

"The court . . . must ascertain and assess:

"1. The value of the property to be condemned . . .;

"2. If the property sought to be condemned constitutes only a part of a larger parcel, the damages which will accrue to the portion not sought to be condemned, and the construction of the improvement in the manner proposed by the plaintiff." And, in subsection 7 of Section 1248—"as far as practicable, compensation must be assessed for each source of damages separately."

It is seen that in some states the testimony must go to the value of the part taken—the easement—and also to the damage to the part not taken —the severance damage. Severance damage is the subject of most differences of opinion in right-of-way valuations.

The value of an easement must be less than the value of the fee to the easement area. Property is a bundle of rights. As expressed by the Supreme Court of the United States in the General Motors Case (1944):

"Property means that group of rights inhering in a citizen's relation to the physical thing, as the right to use, possess and dispose of it."

We value rights, not things. The fee title is a bundle of rights. These rights are separable and each can be transferred to others. In a strip of land the fee owner has all of the rights—the whole bundle. He can transfer any one of the rights to any party. He can transfer to one party the right to construct a pipe line beneath the surface, and to another party he can transfer the right to construct an electric power transmission line on the surface, and to a third party he can transfer the right to farm the surface of the strip, either for a terminable or perpetual duration.

It is fundamental that the value of a part of anything must be less than the value of all of it; and the value of a right-of-way must be less than the value of the fee in the right-of-way strip. There is no legal nor any economic sanction for a valuation on the basis of (a) the kind of use made of the easement area, or (b) the intensity of the use, or (c) any peculiar value to either the fee or the easement owner.

The measurement of the market value of a part of a property, that is, the rights of use of a part but not all of the property, has been well defined by the sales of surface rights, exclusive of the subsurface, and of the subsurface rights, exclusive of the surface, of urban lands in various large cities.

For example, in New York City, the lots fronting on Park Avenue are divided horizontally at the surface; the rights of use of, and above the surface, for a building, are held by one party, and the rights of use below the surface are retained by the New York Central Railroad Co. for the use of its tracks. Other examples can be cited.

An analysis of numerous such sales of fractional parts of property, many of which transactions had to have the approval of the Interstate Commerce Commission, reveals that a maximum of 85% of the fee value is attributable to that part of the bundle of rights of use which apply to the surface and above and that 15% of the fee value is attributable to the rights of use of the subsurface.

These and other facts found in the market place lead to the conclusion that the value of a right-of-way, or easement for an electric power transmission line cannot reasonably be more than 85% of the fee value; and, that the value of a subsurface easement for a pipe line cannot be more than 15% of the fee value of the strip. However, in actual practice, power line easements are acquired at a typical rate of 70% of the fee value of the strip, and pipe line easements at up to 50% on the theory of joint use.

Severance Damage

Severance damage may or may not arise by reason of the taking and construction in the manner proposed. A severance damage is a lessening in the value of the remainder, that is, the rights not taken. Inasmuch as the easement taker seeks to acquire only certain rights of use of the area in the easement strip, but not all of them, it is possible that there may be an injurious effect upon the value of the remainder rights of use in the strip, as well as an injurious effect upon the value of the remainder rights of use outside of the strip. However, in a practical sense, the so-called theoretical severance damage to the remainder

* From a paper presented at a recent joint conference of the Administrative Services Sections, PCEA and the PCGA, in Los Angeles.

rights in the strip usually are compensated for in the valuation of the easements rights.

Before considering the damage or lessening in the value of the property outside of the easement strip it should be mentioned that the condemning party does not have a legal right to take more than is reasonably necessary. Specifically in most states it does not have the right to take the fee title if an easement will suffice; nor does it have the right to fence along the easement and thus create two remainders, each isolated from the other, unless it can be proven that such fencing is necessary. The condemning utility company may have the legal right to take all that it needs, but not more. This is sometimes referred to as the "principle of reasonable necessity."

As hereinbefore stated, a severance damage may be caused by (1) the taking, and (2) the construction of the improvement in the manner proposed. The taking itself may be such as to leave a small irregular parcel on one side of the right-of-way, which, because of size, shape or topography, cannot be used as profitably by itself as it could have been used in conjunction with the area taken. Such a loss in value, if any, is compensable. The construction of the improvement in the manner proposed may adversely affect the ingress to and egress from the remainders, or either of them. If a loss in value is caused thereby, then this too is compensable.

Damage Claim Conditions

However, as regards a right-of-way for an electric power transmission line, there may be advanced a claim for damage which is based upon one or more of the below-enumerated conditions, all of which actually were alleged in an answer to a complaint filed in Los Angeles County several years ago:

1. An impairment of the use and enjoyment of property because of unpleasant and persistent noises, vapors, and other disturbances;

2. Impairment of the use of adjacent property because of the transmission of heavy charges of electricity, an inherently dangerous substance, which, through seepage, leakage and discharge permeates property and creates annoying and injurious magnetic fields which prevent the normal use and enjoyment of radios and other electrical and mechanical appliances;

3. Which occasions a likelihood of dangerous accidents from falling towers and wires, thereby creating fear, anxiety, and worry on the part of the occupants of the subject property;

4. And constitutes annoying, injurious, dangerous and unsightly structures in close proximity to the subject property that are active and continuing nuisances and prevents the normal use of said property, and consequently diminishes the rental and market value thereof.

These claims were born of emotion and not fathered by facts. This may be ascertained by a survey of acquisition costs of electric companies in many states. The nuisance of noises, if any, usually is less than that produced by vehicles traveling on the street. The danger of seepage of energy is speculative and conjectural, and usually unfounded. The normal use of radio demonstrably is not adversely affected, if the instrument is in good condition. The fear of falling towers and wires is too speculative and conjectural to be worthy of consideration. The so-called unsightliness of the towers is a matter of personal taste and in no sense objectionable to a large segment of the population, as evidenced by the fact that people build residences along power lines.

The ultimate fact to be found is the lessening in market value, if any, irrespective of the causes therefore. Beliefs, feelings and notions should be subordinated to facts found in the market, such as sales. In the final analysis, the proper question to be answered is the appraiser's opinion of the public's opinion as reflected by transactions.

The cost of acquisition of a power transmission line right-of-way has been from 30% to 100% of the market value of the fee in the right-of-way strip, with a typical cost of about 70%, and without any additional payment for severance damage. These figures were found in a survey of acquisition costs in the Far West and elsewhere in the U. S. The purchases represent the verdict of the market place. In the market value estimation, who dares say the public is wrong?

The unpardonable sin in appraising is the development of a belief into a theory of damage without a foundation of fact, if facts are available. While it is true that there are some who would not live alongside a steel tower line, it is equally true that there are others who prefer such locations because of the separation from neighbors, better light and air, and a better sense of freedom of space.

For example, in 1917 the City of Los Angeles built a steel tower power transmission line across acreage bounded on the south by Los Feliz Blvd. and on the north by Griffith Park. About eight years later this land, including the right-of-way, was subdivided into lots upon which were built single family residences at costs ranging from $25,000 to $40,000 (in the 1920's). Some of these lots had a tower in the front lawn, and the properties were owner-occupied by prominent citizens of Los Angeles. In the Chapman Woods neighborhood in East Pasadena a tract of acreage adjoining the steel tower line of the Southern California Edison Co. was subdivided into single family residences. Interviews with occupants of the houses adjoining the power line revealed that, without exception, these lots were selected in preference to others distant from the line, and at the same price.

Zone Valuation Theory

In view of these facts, this discussion will now be directed to a theory of valuation of a power line easement that has gained some currency in technical magazines, and that is without merit. This is the "zone theory," also called the "relative location damage theory." Each is predicated upon the assumption that the value of the right-of-way is 100% of the market value of the fee in the right-of-way strip, in addition to an amount for severance damage, or diminution in the value of the land outside of the right-of-way strip.

The author of the "relative location damage theory" illustrates his idea with an example of the estimation of the amount of the just compensation for a 100 ft wide right-of-way for a power line across a farm (in Missouri) which is valued at $218 per acre before the imposition of the easement. The right-of-way area is 8.11 acres. He values the easement at 100% of the value of the fee plus a severance damage that is equivalent to 75% of the easement value, thus making a total cost that is equivalent to 175% of the fee value of the land in the right-of-way strip.

The principle involved affirms that the total compensation is, first, 100% of the fee value of the right-of-way strip, in addition to a damage of 50% of the fee value of two adjoining strips, one on each side of the right-of-way, and each having a width of one-half that of the right-of-way, and, in addition to these he allows another damage that is equivalent to 25% of the fee value of two additional adjoining strips of the same width. Stated otherwise, the severance damage is assumed to extend to all the land outside of but within 100 ft of the right-

of-way, and is 37.5% of the fee value of such outside strip.

The reason for the criticism of this theory is that it does not fit the facts found in the market, as evidenced by actual transactions. Tragically it is a theory killed by facts. The assassins are the experiences of electric utility companies.

Corroborating evidences of the lack of warrant for the theory are the experiences of railroads in the acquisition of rights-of-way. In the acquisition of a railroad right-of-way strip, the cultural and other surface rights are taken from the fee owner; in contradistinction, a power line right-of-way reserves to the fee owner the use of the right-of-way strip for farming, and for other purposes, in most cases. For the railroad right-of-way this warrants an award of 100% (less $1 for the underlying fee); and for a power line easement, a substantially lesser percentage. So much for the value of the easement, per se.

As regards the severance damage, the taking of a railroad right-of-way through and across a larger parcel carves the remainder into two noncontiguous parcels of land which, because of the residual size, shapes, fencing, accessibility, etc., may cause a shrinkage in the value of either. On the other hand, the taking of a right-of-way for an electric power line does not include the right to fence or otherwise prevent movement across the strip, from one side to the other.

Studies of right-of-way acquisition costs of railroads which were made by the railroad Presidents' Conference Committee, comprising 44,263 individual purchases, indicated a cost that was equivalent to 193% of the fee value of the land in the right-of-way strip. Specifically the negotiated purchase prices of the Santa Fe Railway Co. in Fresno County, Calif., for a 100-ft right-of-way which extended diagonally across farms at an angle of 67° was 222% of the fee value in 21 cases of bearing citrus orchards, and 181% in 12 cases of unimproved lands adaptable for citrus culture.

By way of comparison, the cost of acquisition last mentioned, being 181% of the value of the fee in the right-of-way strip for a railroad, tends to indicate the fallacy of the 175% estimate for a power line right-of-way as computed by the so-called "relative location damage theory" as previously shown.

Additional evidences of absence of warrant for the valuation of a power line right-of-way at more than the fair market value of the fee in the strip are purchases of entire ownerships by electric companies, and subsequent sales at the purchase prices but with a power line right-of-way reserved.

At this point it might be mentioned that corporations sometimes pay excessive prices for rights-of-way, which prices are not evidentiary of fair market value for the reasons: (1) the corporation may not have had the right of use of the power of eminent domain and was forced to accept the owner's terms; (2) the corporation may have had the right to condemn but found it advisable to pay an excessive price in order to avoid a costly delay in construction or operation of its facility, or because of the uncertainty of the outcome of litigation and its attendant cost. If the utility was possessed of the right to condemn, then the purchase prices paid in the majority of the negotiated acquisitions are better evidence than the holdup prices paid in a few instances.

Perhaps the greatest failure of appraisers is in reaching a conclusion without first validating the premises upon which the conclusion is founded. There is no defensible argument in support of the substitution of a fact by a theory.

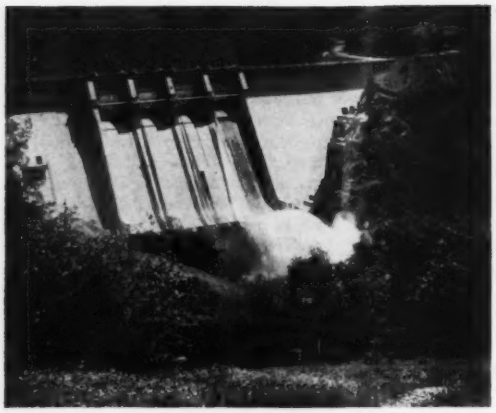
The function of the appraiser is to express his opinion of the public's opinion of value, rather than his own personal belief or feeling. His beliefs, feelings and notions should be subordinated to the facts found in the market. Actual purchase prices are more persuasive evidences than naked opinions. The verdict of the market place should govern.

In conclusion, a calm and dispassionate analysis of purchase transactions leads to the inescapable conclusion that in the vast majority of cases the presence of a power line does not adversely affect the market value, or going selling price of the property outside of the right-of-way area. Some people may object to living alongside a power line while others seek such sites, with the result that the market price is not adversely affected by the feelings of the few.

Spot Welder Delivers 105,000 Amp to Ryan

Output of wing fuel tanks recently was accelerated at the plant of Ryan Aeronautical Co. at San Diego, Calif., by the installation of the large resistance welder illustrated. The new machine can handle such heavy gages as two pieces of ⅛-in. thick aluminum alloy, or two pieces of .156-in. thick Austeritic or nickel alloy, to the unusual throat depth of 60 in. The machine was made by the Federal Machine & Welding Co. to Ryan's specifications. Said to be the largest machine of its type, it is a combination spot welder, roll spot welder and seam welder. The machine can deliver 105,000 amp at electrodes under a pressure of 9,100 lb.

Two other spot welders only slightly smaller were also recently added to Ryan's existing 39 machines. In contrast with machines in the plant operating on single-phase a-c or electrostatic stored energy, the new welders are 3-phase to single-phase frequency converted-type equipment providing a balanced 3-phase load and greater versatility for difficult welding jobs.



Big Creek 4 Dam (left) is of new type with splitter blocks in bucket of dam to dissipate energy of falling water and help prevent erosion of river channel below dam. Right: View down penstock showing switchyard and Big Creek plant of Edison Co.

More Hydro for Southern California

Completion of Big Creek 4 plant of the Southern California Edison Co. costing $20 million adds 84,000 kw of new hydro and brings Edison's installed capacity in its Big Creek development to 516,000 kw. The plant, simple in design, is located in the lower reaches of the canyon section of the San Joaquin River, northeast of Fresno, Calif.

The project consists of diversion dam, tunnel, penstock and power house. The 248-ft-high, 891-ft-long concrete gravity-type dam has one feature of particular interest. The spillway bucket of the dam has splitter blocks to deflect the water so that most of its energy is dissipated in the air and the water falls to the river channel as spray instead of as a solid stream. The design is to prevent erosion and this is one of very few dams of this type in the West. Drainage area is 1,292 sq miles; storage capacity 35,000 acre-ft and spillway capacity 100,000 cfs.

One of the four spillway gates is remotely controlled from the power house as is also everything at the dam. This includes a 375-kw fish water generator built into the dam. An Elliot generator of this capacity is driven by a Pelton turbine which discharges sufficient water to maintain fish life in the river channel between the dam and power house.

All functions at the dam are supervisory controlled over a 2-wire metallic line using Control Corp. equipment. Functions of the control are to indicate water level in the reservoir, head loss through the trash rack, position of spillway gate and intake gate, operation of both gates and complete control over operation of the fish turbine and generator. Power for the supervisory control is 48-v, d-c, supplied by storage batteries.

An automatic starting gas-engine-driven generator is provided for emergency power for all equipment at the dam.

Tunnels—Penstock

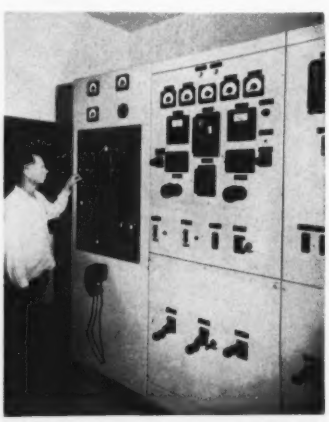
There are two tunnel sections, each of 24 ft nominal diameter. One section is 2,405 ft in length, the other 8,106 ft. Between the two is a 15½-ft steel pipe siphon crossing over Willow Creek. The tunnel terminates in a restricted orifice surge chamber 200 ft deep varying in diameter from 55 to 40 ft, excavated in solid rock.

In driving the tunnel it is believed that a world's record was established for a bore of this size. In one week 241 ft of 24-ft horseshoe section was driven through solid granite. Progress for the entire job averaged better than 200 ft a week.

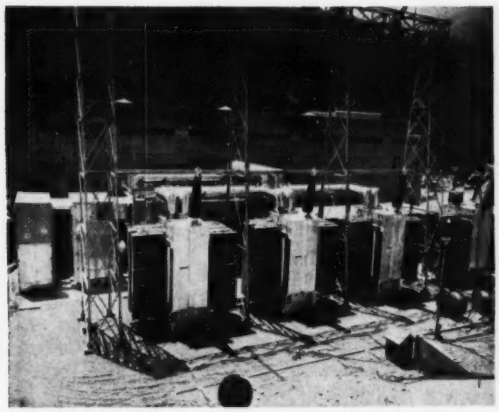
The penstock consists of a 15-ft welded steel pipe, 631 ft in length. Thickness varies from 1 in. to 1⅝ in. At the power house it branches into two 10½-ft pipes leading to the turbines.

Power House

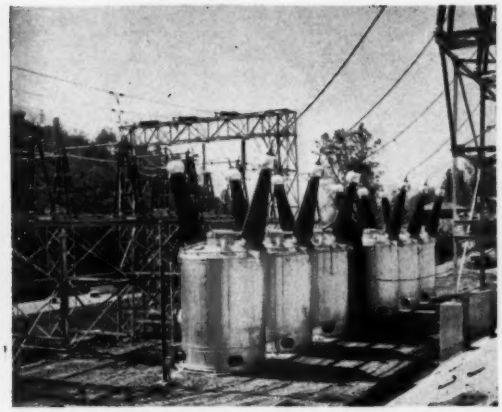
The power house is a simple concrete structure housing two turbine-generator units. The turbines are of the Francis type, 57,500 hp operating under a static head of 418 ft, and were made by the Pelton Water Wheel Co. Westinghouse butterfly valves were provided in the penstocks leading to the turbines. No relief valves



All controls and indications at dam are supervisory controlled from power house



Isolated phase bus (4,000 amp) connects generator leads to low side of 84,000-kva power transformer bank (left) through 15-kv



metal-clad air circuit breakers. High-side 220-kv leads extend to switchyard (right), on hillside, with 3.5-million-kva breakers

were provided, the penstock being designed to withstand the pressure resulting from full load rejection in five seconds.

Generators are of 42,000-kw capacity, one supplied by Allis-Chalmers, the other by the General Electric Co. An ITE 4,000-amp isolated-phase bus extends from generator terminals through 4,000-amp metal-clad air break 15-kv Kelman breakers, thence to the low side of the 28,000-kva Westinghouse single-phase step-up power transformers.

The 220-kv leads extend to the 220-kv switchyard terraced on the sloping river canyon. The 220-kv, 3,500,000-kva interrupting capacity breakers were supplied by Kelman, the 220-kv disconnects by Cole Electric Co.

A new 220-kv steel tower ACSR transmission line extends to Bakersfield in the lower end of the San Joaquin Valley, thence to Los Angeles.

Another 7-mile section of 220-kv line extends up the river to Power Plant 3, where three existing 220-kv lines feed from the switchyard.

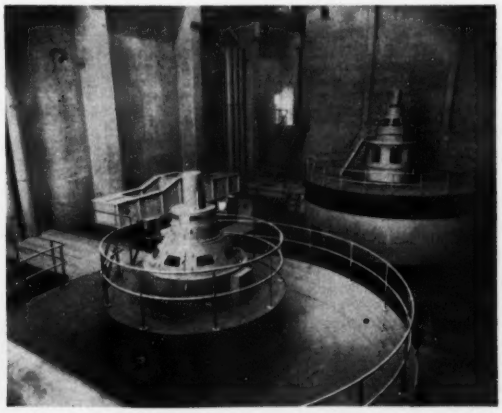
Auxiliary Power—Control Room

Auxiliary power is supplied by a 375-kw Elliot generator driven by a Leffel turbine. The control room, illustrated, is centrally located with windows looking into the generator room. The control room is of conventional type except for the supervisory control panel for the dam. Functions of this control were previously described.

Addition of Big Creek 4 brings Edison total system generating capacity to 1,845,420 kw. The project is part of the company's current expansion program, which will amount to more than $340 million for the six years ending with 1951. Work is also under way on the new 250,000-kw steam station at Etiwanda near the Kaiser steel mill.

The entire Big Creek 4 development was built under contract. The project was headed by John Kiely of the Bechtel Power Division as project sponsor for the joint Bechtel-Morrison-Knudsen venture, with James Wells of M-K responsible for dam and tunnel construction. Power house construction, channel improvement, switchyard and penstock were under K. O. Taylor of the Bechtel Corp. as superintendent. For the Southern California Edison Co., W. L. Chadwick, vice-president in charge of engineering, had complete supervision.

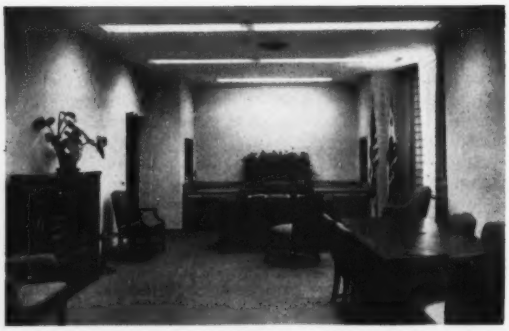
Well-lighted control room (left), has window looking into generator room right. Generators are 42,000-kva machines driven by



57,500-hp Francis-type turbines operating under a static head of 418 ft. Penstock consists of 15-ft welded-steel pipe, 631 ft long

Pleasingly lighted Assembly lounge at left. Right, lines of light and pattern at end of corridor give striking hallway lighting effect

Special Lighting in New Capitol Building



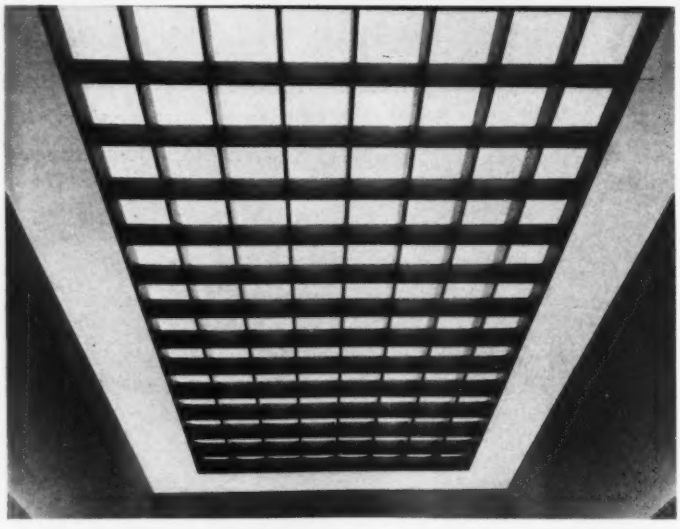
Lighting in front of elevators and for executive's office, above. Lower left, work area lighting, and at right, small committee room

All lighting is recessed in new Capitol building. Above, ceiling in large committee room. Below, secretarial and receptionist offices

California's new $7¼ million east wing Capitol building at Sacramento with its de luxe quarters and appointments called for something special in the way of lighting. "Gold Plated" would be too superlative a term to describe the lighting installation. Simple, effective, appropriate and most pleasing would be better terms.

The new east wing is a monumental structure of six stories with 286,500 sq ft of office space and 60,400 sq ft of parking area in the basement. The building contains new quarters for members of the state legislature, lounges, committee rooms, the governor's suite of offices and space for other departments of state government.

Lighting throughout (except basement) is of the recessed or troffer type. A number of special fixtures were built by the Columbia Electric & Mfg. Co. of Spokane, manufacturer of practically all of the lighting fixtures. For instance, in certain special quarters a 4-ft square recessed unit with 4x4x4-in. alzak aluminum eggcrate louver was provided. Two of the accompanying staff photographs show applications of this unit. The effect is most pleasing, particularly in two large legislative committee rooms that seat 300. In the main portion of the ceiling and that over the balcony the Anemostats for the air conditioning system are built into the center



of these square lighting units. This provides a pleasing soft pattern effect. In the high ceiling over the legislators' desks on the lower floor of this room are installed flush-mounted slimline units with Holophane Controlenses. General intensity is 60 f-c.

The same type of square, deep alzak louvered unit was used in the governor's large reception and waiting rooms; and in halls in front of the four main elevators. A 2x2-ft version of the same unit is used in hallways in the governor's suite. The governor's spacious office and large study have louverall ceilings as illustrated. In the study there is a very attractive bronze incandescent fixture for effect, mounted in a hammered copper Anemostat in the center of the room. Above the louvers are square sheets of plexiglass to hide the fluorescent light sources above in both the governor's office and study.

Executive offices, reception rooms and large work areas are provided with a recessed slimline unit with deep, 45° cutoff, alzak aluminum baffles. These are shown in some of the accompanying photographs. Average intensity where this unit is used is 60 f-c, maintained. Still another type of unit was used in the several small committee rooms. This is a deep V-shaped open alzak aluminum troffer running crosswise of the rooms, using the large low-brightness T17-40-w slimline lamps.

The beautifully appointed senate and assembly lounges were provided with fluorescent cove lighting, high lighted for effect with modernistic incandescent table lamps. Special lighting effects were provided in hallways and the main entrance lobby. At the end of hallways a square pattern effect is achieved with recessed units using Holophane lenses. In the high ceiling main building entrance room the entire ceiling is lighted by 30-in. square luminous panels set in deep jet black timbered squares. The effect is most striking. Both of these applications are illustrated.

Complete absence of any pendant lighting units immediately impresses the trained lighting observer. To the workers and the general public the lighting presents a pleasing high-level comfortable effect without glare from these unobtrusive fixtures.

Lighting design as well as architectural design was under the State Department of Architecture. The entire electrical installation was made by the Victory Engineering Co. of Los Angeles under the capable foremanship of Harry F. Dalo.

Louverall ceilings in governor's suite, top, bottom. Center: Patterned entrance effect

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Except for the few big jobs at army or navy posts or for AEC, the volume of electrical construction steadily declines as jobs in progress are finished. Yet, despite less volume and higher costs, bidding reflects the desperation to try to stay going. Reason seems to be powerless against the urge for survival, even when reason would indicate that the means taken to survive are the very ones that will bring disaster.

Still slower

Dryness and lack of normal rainfall and continued hot weather have made it bad for contractors doing line work in state or national forests. The Forest Service makes them watch a pyrometer. When the humidity drops down below safe level work must stop. Sometimes that is at 9 or 10 a.m. Result is labor cost skyrockets, work schedules cannot be met, linemen leave the job to boom elsewhere—notably in Kansas where flood damage repair offers steady work and lots of overtime. Line contractors in Northwest Line Constructors Chapter have fought through a "coyote" shift deal in which men start work at 5 a.m. for one hour overtime and keep working 'til the humidity stops them, sometimes getting in a half day.

Dries up work too

Wage rates continue to be advanced by generous contractors who do not seem to connect these rates with the customers' resistance to the prices they have to charge for labor or to the slack in business they are feeling. Los Angeles Chapter NECA met the $2.75 scale of other California areas but, in lieu of protection of already bid jobs, took a 120-day negotiation notice . . . Even Vancouver, B.C., contractors went for a 35c an hour increase, in two steps, 20c now, 15c Oct. 1, and agreed to an additional 5c an hour donation into a welfare plan trust fund.

Same old pressure

Wiring supply sales to consumers for self-installation are booming in the chain stores and even among contractor-dealers. The chains seem to have plenty of wire and cable and fittings—even instruction sheets.

Roll their own

Sacramento Valley Chapter of NECA protested to Eric Johnston, ECA, over the enticement of workmen from civilian jobs by the overtime opportunities at double-time offered on big government jobs. It advocated reduction of overtime on government work to time-and-a-half as one means of relief.

Wrong incentive

Out of the printing presses of Washington came more detailed orders for operation of the CMP program. Producers of copper were ordered to reserve for rated orders certain percentages of their monthly production. Copper was prohibited from use in 30 building material items. Former limitation of $35,000 on residential housing was changed to 2,500 sq. ft.; tightened up the $2,000 worth of personal property allowed added in fixtures and equipment. Set up a CMP-Reg. 5 to take the place of the former loose maintenance-repairs-operating supplies quota and Reg. 7 was set up for repair shops to get materials for such work. The old M-4 has been replaced by a new one, much the same as before.

Regulations roll out

Pricing for construction at least was being worked on during July. A construction industry advisory committee was set up to try to develop some such formula as MPR-251 was during the last war. J. D. O'Connor, District 6 vice-president and Bob Hughes, Spokane, were on it to represent the electrical contractors and subcontractors. Final decision may await the action of Congress on extension of controls. As this was written a considerably less severe bill than the President asked for was about to be passed, one which would permit some wage increases to be passed on in the price.

But pricing awaits Congress

Electrical Inspectors Assn. of B.C. has set the date for its third annual conference as Nov. 2-3, at Hotel Georgia, Vancouver. L. Ryan, president, announced as subjects to be considered: diversity factor, electric house heating, load regulators, pole line construction safety, changes in the Canadian Electrical Code, cold cathode lighting, fluorescent fixtures.

Inspector meeting

Sam G. Hibben, Westinghouse director of applied lighting, becomes the new president of Illuminating Engineering Society when it meets in Washington, D.C., for its annual technical conference, Aug. 27-30. Well known in the West because of numerous visits, Hibben has served on almost every IES committee. Walter Sturrock, General Electric Co., will preside over the conference.

Reaches top

Tells the world

Simon Halle of Colorado Springs really sells adequate wiring and all of its potentialities, such as low-voltage control. In two almost full-page ads in the Colorado Springs Free Press he tied in with his installation of an exceptional electric wiring and lighting system at the Garden of the Gods Club. One of the ads features the "1951 electrical marvel," the Square D low-voltage remote-control system; the other tells that the builder of homes in the new Belleville tract, John Bonforte, will install certified adequate wiring. Halle was recently chosen NECA representative on NAWB.

Next code schedule

Full schedule for the next revision of the National Electrical Code has been set by the Electrical Coordinating Committee of NFPA. It will be the 1953 edition. Merwin M. Brandon, Underwriters' Laboratories Inc., has been named chairman of the committee upon the retirement of Alvah Small, who has headed this work for many years. Brandon has attended many Western section meetings of IAEI. Deadline for receiving outside proposals is Jan. 1, 1952.

Back

Jimmie Land has again become district representative for Zinsco Electrical Products in northern California, with office at 190 MacArthur Blvd., Oakland. Zinsco closed its Oakland plant some time ago but is shipping out of its Los Angeles factory.

Contact man

Appleton Electric Co. has appointed O. Fred Rost, former editor of Electrical Wholesaling magazine, as vice-president in charge of industry relations.

Fluorescent standards

So that 30 different types and sizes of fluorescent lamps will be interchangeable, a study of five years has just been published by the American Standards Assn. These standards are designed to make it possible for consumers to specify a lamp of a given type with the assurance that lamps made by any of the various manufacturers will be mechanically and electrically interchangeable. The standards include cold cathode and bactericidal.

Double duty

Holophane Co. Inc. has made its new and enlarged executive offices at 342 Madison Ave., New York City, into a Light and Vision Institute as well. It includes a lecture hall and demonstration laboratory for its Controlens and Illumineering of color to architects and engineers, public utilities, industrial safety groups, students, optical societies, electrical distributors and contractors. A sensational feature is a giant light control board divided in compartments in which to show various control patterns. It has a new booklet too, telling "The Story of Holophane."

Mountain office

General Controls Co. of Glendale has opened a new factory branch office in Salt Lake City, one of five new offices. John Ferguson is manager of the new office there.

New system

Sylvania Electric Products has strengthened and improved its industrial fluorescent fixtures HFFS-296 and 248 and now catalogs it as S-2968 and S-2484, without increase in price. It also announces a new catalog system.

Defense contracts

A subcontractor clinic of the industrial services branch of the Department of Defense is to be held at Hollywood Turf Club, Sept. 18-21, to allow those interested in subcontracts for defense items to see what is needed to be made. While electrical contractors seldom figure in these programs to get small business into the defense program there are two pools in California, one in San Jose area, another Fresno, set up to do such work. The Department of Water & Power, Los Angeles, is making a survey of its 8,000 industrial customers to determine their defense production intentions in order to assure power supply for them.

Sight and sound

Wakefield Luminous Acoustical Ceiling is treated in complete detail in a 34-page, 8½x11, spirally bound book replete with drawings, diagrams, architectural and engineering and other data, now available on request to the F. W. Wakefield Brass Co., Vermillion, Ohio. It covers the conception, principles, development in cooperation with MIT authorities, applications to old or new construction, methods, colors to use in room decoration, data on illumination, acoustics and air conditioning.

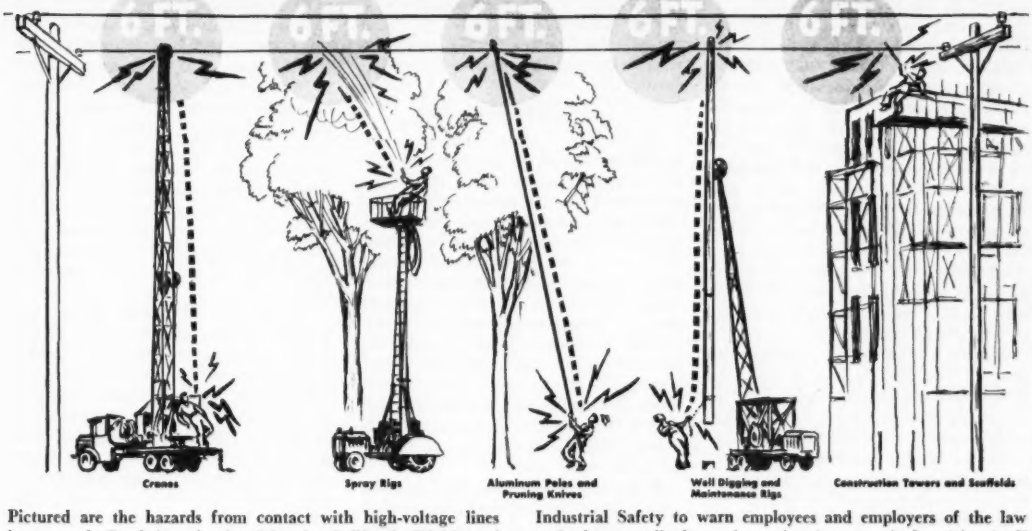
Contest

A $2,500 merit award competition in lighting is being planned as a feature of the 4th International Lighting Exposition and Conference to be held in Cleveland, May 6-9, 1952.

Modules have it

B. A. Mitchell, president of Mitchell Mfg. Co., has announced that the recent Supreme Court ruling on fair trading will not affect pricing of the company's Module units because individual contracts were signed with all of its distributors to maintain fair trade prices on them.

Keep Cranes, Booms, Equipment, Metal Tools, etc., at least 6 ft. From Overhead Power Lines



Pictured are the hazards from contact with high-voltage lines in a new leaflet being circulated by the California Division of Industrial Safety to warn employees and employers of the law and also to tell them about the dangers of electricity itself

What's Different in the New Safety Orders

Interest in the California Electrical Safety Orders extends beyond that state and its electrical industry. For many years these orders have been a forerunner of requirements that have later found their way into the National Electrical Code. Always there have been some differences from the NECode because the Safety Orders' prime consideration is that of safety to humans rather than prevention of fire.

One of the most controversial issues in the revision of the Safety Orders was whether the National Electrical Code could be taken as the base and such special rules differing from it made a supplement to it. Two reasons prevented this. First was that the Safety Orders become a part of the state's codes. As such they must be correlated into the numbering system used for the complete codes. Second was that a different arrangement of the contents was desirable. The Safety Orders start with the service drops to the premises and follow on through services to wiring methods and then services to special applications.

As to the numbering system a series of numbers from 2300 to 2606 and a limited number of page numbers was assigned to the Electrical Safety Orders. These page numbers begin at 181 and run to 358. Even so, because the orders could not be printed in that number of pages, there are 54 pages included with 358 after a decimal point, such as 358.54. With such limitations the Safety Orders have to include as subparagraphs a number of related rules whereas the National Electrical Code gives each paragraph a number.

Last previous revision of the Safety Orders was made in 1934; the previous one in 1925. It took approximately four years of committee meetings, hearings and rehearings to make the present edition, which became effective March 28, 1951, although copies of the orders were only available from the state printing office in July. (They may be purchased from the Printing Division, Documents Section, 11th and O Sts., Sacramento 14, Calif., at $1 plus tax.)

Authority of the orders extends over that of any local ordinance or code where the requirements are less than those in the orders, so far as they apply to places where persons are employed. Hence they do not cover house wiring or small commercial or industrial occupancies unless someone is employed there. They supersede the National Electrical Code also in such cases. Moreover, since their purpose is that of safeguarding human life, their effect is retroactive. In other words, existing installations not conforming to the orders can be ordered to be brought into conformity by the state inspectors.

Some of the important features of the orders and differences from the National Electrical Code are:

Outside Wiring—Article 3, 2316-22, p. 196, provides that the California Public Utility Commission Rules (GO-95) shall be complied with, and for the convenience of the user of the orders the tables and rules for clearances are included in this article, rather than being run in the back of the book with other tables.

Rating of Service Switch—2330-g, requires that the service switch shall have a rating sufficient to carry the rated load and capable of interrupting safely the rated current at the rated voltage. In the NECode this is not specifically stated, although Underwriters' standards for switches and circuit breakers suitable for service equipment carry that requirement.

In 2330-h it calls for **pressure connectors** and says that connections that

depend on solder shall not be used (where service conductors are attached to disconnecting means).

To clear up one of the arguments made possible by the wording in the NECode 2330-b-1, the Safety Orders provide that a **single set of service entrance conductors** (at less than 300 v) may be run to more than one individual service switch, if grouped near the entrance, provided that each switch shall control the entire current carried by one individual service of the group. Not more than one service may be for the same consumer. And where the number of service switches exceeds six, the entire current shall be taken through one main disconnecting switch.

High-voltage service equipment may be installed in lieu of low-voltage service equipment, it is stated in the exception after paragraph 2335-a, which calls for treatment of the secondaries to be considered as services where the high voltage is transformed to 600 v or less.

Recognition is also made of the high-voltage fused load break switch (like S&C and Westinghouse) in 2335-b-2-D, for services to transformers, yet a switch is still required in the primary or secondary because these alone are not suitable for interrupting the total load. This same provision is found again in Article 9 and also 30.

Several motors on one branch circuit, permitted in the National Electrical Code in machine tool assemblies, are permitted for other applications, such as woodworking and other tools, in the Safety Orders (2396-d), but the provision in the code (4330) in regard to the heater element in the starter is omitted because none are made at ratings above 30 amp. If such elements fail they do so in an enclosure and are not considered a hazard.

In 2398 the previous rule that **controllers have horsepower rating** remains with some other requirements, among them that a motor and its driven machinery shall be within sight of the controller location. A manually operable switch that will prevent the starting of the motor is required to be placed within sight of and not more than 50 ft from the motor location. This switch may be placed in the remote-control circuit of a remote-control type of switch.

The orders require mechanical-interlock type of switch that prevents opening the door until the switch is opened. The accident record is high, experience has shown, with the non-interlocked switch. The orders still require that any motor over 50 hp on 480 v have a 400-amp disconnect switch, even though it may be fused at 200 amp. This is not necessary with circuit breakers, but 480-v accidents to switches have been so numerous and severe that the extra size is needed.

Grounding of Portables

Grounding of all exposed noncurrent-carrying metal parts of motors, generators and control equipment (such as frames, operating levers, casings, switches) is required in 2400-a. The rule covers motors, fixed or portable, regardless of voltage, in locations exposed to grounded surfaces, such as metal frames of other machines, plumbing, heating radiators, pipe or conduit and conducting floors. This will include most motor-driven office machines. Five feet horizontally and 8 ft vertically are considered in reach. The rule has always applied to portable hand tools.

A fence is required around outdoor transformer enclosures, except where all conductors and current-carrying parts are covered or protected from contact. The NECode does not provide for outdoor enclosures.

One item that has always been controversial has been the rule, now found in 2412-g, that the **switch handle cannot be over 6½ ft above the floor** or work platform. However, circuit breakers or contactors can be attached to an overhead bus duct if means are provided at the floor to open the circuit.

Marking of the rating of switches has always been required but now circuit breakers are also required so as to be clearly visible after the installation of the enclosure or cabinet (2414). This also calls for switches and breakers to have ratings not less than the ampere rating of the load at the rated voltage. The Division of Industrial Safety has found too many cases where a 200-v switch has been used on 480 v, often with tragic consequences.

Fixtures

An attempt is made to clarify the wording relative to lighting fixtures being used as a wiring raceway, a major item of contention in the NECode. In 2428-g it states, "Fixtures may not be used as a raceway for circuit conductors unless they first meet the requirements of an approved raceway, except that the conductors of a single branch circuit may be carried through (1) on installation of fixtures approved for end-to-end assembly to form a continuous raceway; or (2) an installation of fixtures that are connected together by approved wiring methods."

A contention is made however that this assumes but does not say, fluorescent fixtures, as it might be construed to mean incandescent lamped fixtures in which heat generated might damage the circuit wire. Hence they say that this rule still leaves something to be desired as to exact meaning. Inspectors seem torn between a desire to see neat and workmanlike installations and the reality that a group of fixtures joined together by long pieces of conduit, even if it looks patchy, is safe.

Article 18, Working Space and Guarding, has always been in the Safety Orders though only inadequately covered in the code. The section lists spacings required. The division has had so much experience to prove that insufficient work space or lack of guarding has been the cause of many serious accidents. This article also calls for separation of high potential equipment by partitions or screens (2475-g) and for illumination (o) about working spaces near electrical equipment.

In Article 20—Cranes and Hoists, the Safety Orders insist on guarding of all contact conductors; moreover the order is retroactive.

One of the simplifications of the Safety Orders and quite a departure from the NECode, is found in relation to garages. Article 23 makes a separate article for garages, taking them out of the article on hazardous locations. The surprise is that it calls for explosion proof only in grease pits. The 5-ft rule in the code is not there. The reason given is that it is ridiculous to require explosion-proof equipment where ventilation is adequate when garage mechanics use torches, smoke, etc., in such areas. The only trouble experienced by the division has been with greasing pits, in which gasoline vapors sometimes accumulate and explode.

Not new, the orders continue to permit motion picture studios a 400% rating on feeders and breakers on sets because of the short-time use. Experience over many years has shown no trouble from this allowance.

A limit of 25,000 v rather than 15,000 between conductors is set by the orders as being more realistic to actual practice. Most of the high voltage brought into plants to unit substations is actually 16.5 kv, rather than 15 kv, and as no 20-kv gear is made, the 25-kv figure is set.

In the same order, 2568-c, shielding is required in cases where non-leaded, rubber-insulated conductors

are used at higher voltages. On all high-voltage breakers the orders now ask (2569-c) for means to isolate each oil switch or high-voltage breaker from all sources of supply unless automatic equipment to so isolate them is employed.

Emergency Lighting

The Safety Orders do not consider a tap ahead of the main switch or fuses as being truly sufficient where current is needed for emergency lighting. Too many times the feeder to a whole district goes out and such a tap ahead of the main switch means no light. Hence Article 32, in 2583-c sets forth the alternate sources acceptable where emergency lighting is required either by the State Fire Marshall or by local ordinances. These are: (1) a separate serving agency; (2) from different primary mains; (3) a storage battery; (4) generator set; (5) suitable dry cell battery. Also in paragraph g it is required that exit lights have two lamp holders, one on the emergency circuit.

The old values in the 1937 NECode are still used in the current-carrying capacity table, Table 1, Article 35, rather than those of later editions of the code. The reason given is that these values have proved satisfactory in California experience and, according to the division, there was no reason to change them.

Because it is a safety code, a new Article 37 is added and it is in this that teeth are put into the law to prevent contact with high voltage. In addition to the law, which the division is really enforcing, an educational campaign is being carried on too. The pictures accompanying this article are from a small pamphlet being circulated to all employees of equipment such as cranes, derricks, well drill rigs, etc., that are potential hazards. These pamphlets (one is addressed to employers too) call attention to the rule that all such equipment must be kept 6 ft away from all high-voltage lines. This article of the Safety Orders details the safety measures needed and tells the responsibilities of both employers and employees. This edition of the Safety Orders also has sections pertaining to underground electrical conductors and equipment and to substations and switchyards.

There are other minor variations from the code and the old orders, but on the whole the new edition follows the National Electrical Code very closely in principle, even if the arrangement of the Safety Orders is different.

How To Improve Load Factors

The zigzag "curve" plotting load is a straight line at Best Foods Inc., San Francisco. This means, of course, that plant load factor is 100%. It is accomplished automatically by a very simple arrangement. Going a long way toward enabling Best Foods to do this is the fact that one of the plant's processes is the electrolysis of water to obtain the hydrogen used for the hydrogeneration of certain vegetable oils.

The hydrogen can, of course, be stored for use whenever desired. Therefore it is not necessary to carry on the electrolysis at any specific rate. Good advantage is taken of this fact to vary the electrochemical process according to the ups and downs of the electrical load in the rest of the plant. When plant load goes up, current to the electrolytic cells goes down instantly and automatically. The only effect is has on the process is to slow it down.

The automatic "watchman" that accomplishes this is a modified watt-hour meter. The torque resulting from the plant load is balanced against spring tension which is present for any total demand desired. Relays vary the timing of the firing of the Ignitron rectifiers and hence the amount of energy passing through them. The Ignitrons convert at 240-v a-c to d-c. U. G. Karrer, Pacific Gas and Electric Co., San Francisco, reports that the net result is a straight line at a predetermined figure for the over-all plant demand.

Electrically Heated Road Mix Effects Savings

An unusual method of heating road mix for paving by means of steam piping with steam furnished by an adjacent boiler is reported by W. W. Pearce, Los Angeles Department of Water & Power. By reason of the high original cost of such steam equipment, as well as operating expenses for boilers and a high maintenance cost, it was believed that maintaining the 325° temperature necessary offered an oportunity for electrification.

An installation was made wherein the 110-ton concrete tank was heated electrically by means of iron bars serving as a heating element. In this tank, which is 35 ft long, were installed six circuits, each consisting of 80 ft of iron bar and the circuits were energized at 25 v. This results in 60 kw load for the tank, although it appears possible that it could be accomplished with as little as 40 kw. Temperature is maintained by a thermostat.

The load is attractive to a utility because it is essentially a valley load, being off during the daytime when the asphalt arrives hot, and on at night. It is estimated that the over-all saving resulting for electrification of such a hot mix tank is about $600 a month. Its operation has proved successful and has required no maintenance.

This, of all things, is a bull exerciser at the Chilliwick Artificial Insemination Center in B.C. A 3/4-hp motor-driven merry-go-round takes the bulls for a two-hour hike

ELECTRICAL WEST

Coming — A Power Shortage

POWER supplying agencies in the Pacific Northwest must turn a deaf ear to ever-increasing demands that they supply new defense mobilization loads, including such large energy-consuming industrials as electrometallurgical, chemical and pulp and paper plants. Not only is there no power available for these new installations, but even worse, there is an imminent power shortage in sight for the fall and winter.

Waterwise—and this region depends almost entirely upon hydroelectric power—both the spring and summer have been bad. Reservoirs behind power dams which should be full this time of year, have yet to fill. Without heavy early fall rains, there can be a power deficiency in the area amounting to 600,000 kw. This assumes that mobilization requirements would necessitate full-time operation of loads that are now operating on an interruptible basis. Even if such interruptible loads were dropped—they amount to 300,000 kw of demand—the Northwest will be far short of sufficient capacity and energy to meet around-the-clock demands. The situation implies cut backs on all users and serious disruption of the area's economy.

Little can be done to relieve the situation this year. However, much can and should be done to assure no repetition of the situation next year, and the year after that before new capacity will be available from Hungry Horse and McNary. The Cabinet Gorge and Yale projects can be rushed. The licensing of other nonfederal projects, among them Cowlitz and Pelton, by the FPC can be expedited so that these plants can be completed to meet the 1952-53 winter demands. And for the long-range situation, new large federal projects can be activated just as quickly as possible.

Transcontinental Television

WILL Western television set owners see live telecasts of the 1951 World Series? A positive answer to that question will do much to break the log jam in television sales that has worried dealers, distributors and manufacturers for months. Set sales here in the West, as elsewhere in the nation, have been stagnant. Not even price wars will move them. However, the whole industry feels certain that the telecasting of something like the World Series will be the stimulant that starts sales rolling once again. Physically the live telecasts are now possible. A microwave relay link between Omaha and Salt Lake was completed last month. This means that transcontinental telecasting is here, if sponsors pay the toll.

Why All the Shouting?

DURING the first two weeks of the current month celebrations have been held in various communities in California's Sacramento and San Joaquin Valleys celebrating what the U.S. Bureau of Reclamation calls "a major milestone in civilized man's elemental urge to control and utilize the fresh waters of the earth." Under USBR sponsorship the speeches, fireworks and barbecues ostensibly inaugurated integrated operation of the initial features of the Central Valley Project, "a great federal reclamation project, first envisoned when the state was largely a wilderness" (again quoting bureau publicists).

What are the facts? Water is being lifted by the now completed Tracy pumping plant into the Delta-Mendota Canal. The water has its origin in the Sacramento Valley. Otherwise the CVP has been an operating entity in California for years. One unit, the Contra Costa Canal, was completed back in 1940. Shasta Dam and reservoir began storing water in 1943; Shasta power plant turned out energy back in 1944; Friant Dam stored water in the same year. The Madera Canal was finished in 1944 and Keswick Dam and power house operated in 1949. Most of these features functioned initially without celebrations and without oratory.

Furthermore, the region into which water from CVP now goes is far from a "parched desert" or a "wilderness" as USBR publicists infer. The San Joaquin Valley counties which will receive only supplemental irrigation water from the CVP, have long

EDITORIAL VIEWS

led the nation in the value of their agricultural products. Fresno County, where the irrigation water has largely been developed without federal largesse, is the richest agricultural county in the nation. And seven of the first ten counties in the U.S. in value of agricultural products are in the valley. They achieved their record positions without one drop of CVP water.

Could it be that the current CVP celebrations have any connection with the USBR appropriation demands now before Congress? Many Californians think so.

Materials Are Critical

OFFICIAL Washington's attitude toward expansion of power producing facilities is causing alarm throughout the electrical industry here in the Far West. Conservative estimates of the net effect of the defense production program on industrial growth in this region set the new industrial loads scheduled for service in 1951 and 1952 at 1,750,000 kw. To provide the electric capacity and energy for installations of this magnitude, the utilities of the region must have every pound of copper and aluminum and every ton of steel they have requested from NPA. Otherwise their expansion programs will fall far short of fulfilling the power demands of the region.

While some of the material allocations for the third quarter were increased after vigorous protests were registered against the drastic cut backs initially imposed, recent statements of DPA officials indicate that further reductions are possible in the future. Already the present limitations raise doubts as to the ability of the utilities to maintain their scheduled expansion programs. More cut backs would definitely hobble them.

In all of this there is an appalling lack of co-ordination. In many cases the industrial expansions which the utilities must serve have the tacit or direct approval of governmental authorities. If one agency gives such approval, then it would not seem just or appropriate for another to impede the fulfillment of the utilities' obligations to meet the necessary energy requirements.

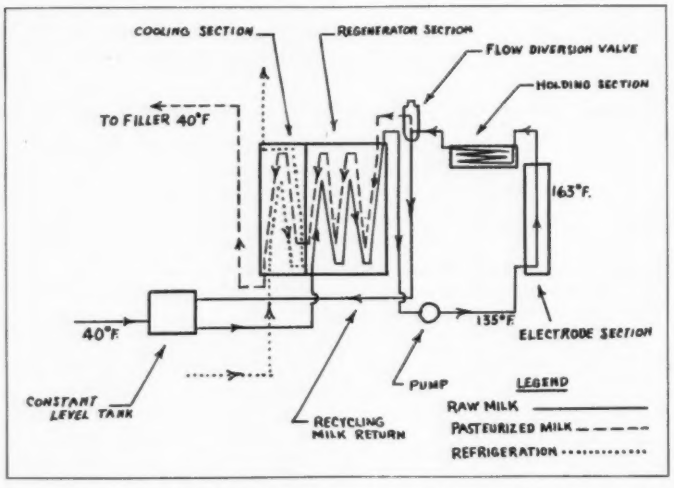
One certain way to relieve the alarm and to assure adequate power supplies is for DPA to assign a top priority to the critical material requirements of the electrical industry. It may be all right for the automobile industry to share and share alike with the manufacturers of other products, but the objective of a guns and butter economy will never be achieved if the electrical industry is asked to live on that basis.

IDEAS formed in a man's mind, after it has been trained and sharpened by education and experience, are the basis of successful research. Without the creative brain of the scientist, all investment in research is worthless. American scientific laboratories are the best equipped in the world. Yet continued progress will be insured only if the rights of the individual to exercise freely his initiative are re-established and jealously guarded . . . In this atmosphere of free inquiry and of freedom of the individual to enjoy the fruits of his labor, science here flourished. Elsewhere in the world it has suffered serious set backs . . . Without freedom, scientific research and the progress in its wake will falter in the United States, as has happened elsewhere. The individual must be assured the freedom of incentive. The university scientist must have freedom of inquiry, of discussion and of publication. And sponsors of industrial research, such as American companies, must have the freedom and incentive to win as well as to lose—the freedom to grow and expand, as is necessary to fulfill their responsibilities. The means to carry on future research will be forthcoming only as long as it can pay its way. When it can no longer do so, it will stop, and the retrogression process begin. In that event, a well-known principle would again be proved: a hoop rolling down hill moves faster than one going up. — Crawford H. Greenwalt, president, E. I. duPont de Nemours & Company.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 83

SUBJECT: Electric Pasteurization of Milk and Other Liquids
CUSTOMER: Jerome Cooperative Creamery, Jerome, Idaho
TYPE OF BUSINESS: Dairy Products
SERVICE COMPANY: Idaho Power Co.
DATA SHEET PREPARED BY: Richard L. Salladay



Flow diagram for carbon electrode, resistance-type, 36-kva electric milk pasteurizer

The Jerome Cooperative Creamery has installed an electric pasteurization system that is a radical improvement over conventional systems. The creamery was not previously in the wholesale or retail milk business. However it had, and still uses, eight steam-coil vats for pasteurizing cream. The new electrical method was selected because of its cleaner and cooler operation and because of the wide variety of products that can be pasteurized by the same apparatus.

Equipment and Operation

The equipment installed is a unit machine having the trade name, "Electrical-Purial Pasteurer," manufactured by the Pur-Pac Division, Ex-Cell-O Corp., Detroit, Mich. Milk, or other liquid to be pasteurized, is drawn by suction from a constant-level tank (see sketch) through the preheating regenerator section by a sanitary constant speed pump where it receives preliminary heating from the already pasteurized milk. It is then delivered to the electrode heater where it flows between the two carbon electrodes under pressure and, with resistance through the milk, reaches pasteurization temperature nearly instantaneously. The milk then flows through the holding section for a minimum of 15 seconds and thence through the flow diversion valve, which checks the preset temperature and automatically returns any that is not at proper temperature to the constant-level tank for reprocessing. Milk that passes through the flow diversion valve goes into reverse regeneration, loses some of its heat to the incoming milk, and then passes to the cooling section where a refrigerant finishes the cooling process. The milk then goes directly to the bottling equipment, or it can be diverted to mixers where chocolate may be added.

Advantages

This electric pasteurizer is a completely automatic, thermostatically controlled, short-time pasteurizer and is suitable for pasteurizing a wide variety of dairy products. It is clean and quiet in its operation and it does not affect ambient temperatures, thus making air conditioning of the plant practical. An improved quality of product is obtained through this electric pasteurization, as cream volumes are fully maintained and the vitamin C content is but little impaired.

Production and Operating Data

The pasteurizer has a capacity of 4,000 lb of liquid per hour. The milk, or other liquid, goes from the pasteurizer to a bottling machine which has a capacity of 36 to 50 qt per minute.

The pasteurizer operates on 220-230-v single-phase service with a demand of 36 kva and an average operating load of 29 kva. All electric service to the creamery is supplied through a single meter, thus it is not feasible to obtain the actual kwh use of the pasteurization equipment.

Ammeter Shows Machine Loading

A vegetable oil extraction plant is operated by the Cargill Corp. of San Francisco. The actual extraction process is accomplished by seven expellers, each powered by 90 hp in motors. There is a wide variation in the resistance of the raw material to extraction, with the result that there are attendant wide variations in the power required by the expellers.

A visual indication of loading is therefore desirable. This is had by placing an ammeter in the main motor circuit located adjacent to the machine. The ammeter is calibrated in per cent load so that nontechnical personnel may control the feed to the machine.

The principle involved may have interesting application in other plants for control of motor loads.

ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

August 1951 ©

Ease control

Sales on credit may take a spurt now that Congress has eased the limits on terms to 15% down and 18 months instead of 25% and 15 months to pay off. But remember that auto credit was eased too and competition for the customer's dollar is going to be strong. It isn't the whole answer to sales. They are back to seasonal trends again.

Slow men at work

Evidently there is plenty of merchandise available and dealers are ordering cautiously and to round out their lines or to replace models sold. Both Los Angeles and San Francisco Markets reflected that. It was the same at the California Lamp & Picture show, a week earlier. only dryers and some de luxe models of refrigerators seem to be in shorter supply than others.

Cut back begins

Meanwhile most major manufacturers have cut back production both to conform to the materials orders and because their inventories have been heavy and movement slow. If the Markets had been a month or two later they would have been more active. Likewise had there been new models to unveil perhaps more dealers would have journeyed to see and to order. As it was, with sizable inventories they stayed home to make sure to sell them.

Frantic fizzles

Advertising has been heavy, throughout the West, both dealers and distributors offering specials and deals. Fair Trade prices had little meaning under dumping conditions, but that war has subsided too as the public got over the idea that it was temporary. Some are still displaying cut prices but nobody is breaking down the doors to take them away. It is definitely a "normal" market again.

Price rise

Servel, which created a sensation with its new motorless electric refrigerator, has announced a price increase on its whole line that ranges from 20 to 30%.

Shows go on

More trade shows coming up—Western Gift, Stationery, Jewelry, Toy and Housewares show, August 5-8, with a theme, "Christmas in August," will be held in San Francisco, at the Merchandise Mart, Palace, St. Francis and Sir Francis Drake hotels and the Civic Auditorium, under Kay Leber management. . . . 4th Western Housewares Show, August 19-22, at the Biltmore, Los Angeles, sponsored by the L. A. Chamber of Commerce. Western Merchandise Mart announced dates for its next markets, 1952 Winter Market, February 4-8; 1952 Summer Market, July 14-18. As usual the Chicago and Los Angeles markets will just precede them.

TV marches on, even if slower--RCA has started experimental color TV in New York and anyone can see it in b&w. It plugs it to b&w set owners in the large dailies, telling them to "look, no wheels." Report is that RCA has even made available to CBS a model of its tri-color tube. . . . Hoffman has arranged to telecast football this fall in the California area and is negotiating to do so in Seattle. May not be the top league but in Los Angeles it will be the Western State and the Metropolitan conferences. . . . Grass Valley, a town in the Sierra mountains, will soon have a master antenna system installed as a sort of public utility by Community Antenna Co Inc., using a Jarrod multiple system. A tall antenna will catch signals from San Francisco stations and pipe them to subscribers' homes. Joint use of PG and E and PT&T poles is contemplated. . . . Sylvania, making both lamps and TV, will bring out a TV set with built-in Halo Light to provide soft surround lighting. . . . An organization calling itself Fair Television Practices Committee protests to FCC that charging admission to any TV programs through use of restricted channels is illegal. . . . San Diego Bureau of Home Appliances and S. D. Gas & Electric Co. is to run a series of testimonal ads from a minister, banker, executive, etc., telling what TV means to them, to reach the reluctant middle income group that's been holding back on buying. . . . Robert Davis, TV committee chairman of Los Angeles Electric League, thinks there's a good chance the World Series will be telecast live to the West Coast this fall over the new microwave net just completed. It would mean Salt Lake City, San Francisco and Los Angeles 1,300,000 sets could receive and some 5 to 8 million people see the games. . . . Same League recently publicized the millionth TV set in the area with ballyhoo and a photogenic Miss Million-TV. . . . Also its wholesale service managers troup passed a resolution that its members would keep a card file on component parts exchanges and reserve the right to contact customers to check actual delivery and installation. . . . Philco says it has new transformers that save 25% copper and silcon steel, reduce weight and improve performance. . . . Emerson says it will streamline its 1952 TV line to a few basic chassis and a limited number of models, 15 in all, with 16-, 17- and 20-in. tubes. . . . Pioneer Electronics of Santa Monica has reached a production of 200 TV tubes a day, its president, L. Parrish, says, and is exploring color too. . . . RCA Institutes have prepared a home study course in TV servicing which it offers to persons engaged in the industry. It is available from RCA distributors. . . . John S. Meck Industries, makers also of Scott, announced a de luxe console with a 24-in. screen. It has also made its Silver Anniversary TV chassis and radio chassis available to dealers for custom or built-in installations. Claims to have the lowest priced TV receiver, a 14-in. rectangular tube table top model for $139.95. . . . Kaye-Halbert of Culver City offered a summer special on its decorator series. Price cuts ranged from $5 to $90. . . . Tech-Master Products of New York offer a budget priced kit for up to a 14-in. tube, to sell for less than $90 to those who roll their own. . . . DuMont has a new policy of guaranteeing replacement tubes for six months from date of installation instead of from shipment. . . . Dorris-Heyman Furniture Co. of Phoenix recently introduced the first Singer 24-in. TV console set, its inventor, Commander Eugene Singer, attending the affair. . . . Woodbury College of Los Angeles has published the results of its fifth tele-census, a sampling of 10,000 owners and nonowners in California, Portland and Denver. Some interesting data on preferences on programs, sets and views on phone-vision and theater TV are in it. Age of sets and who influences the buying most, and whether programs are considered harmful to the kiddies are in it too.

Scanning TV

Pipeline

After the hold outs

Watch the channel

Made in the West

To aid tube replacements

A three-day home freezer school to teach Utah housewives how to prepare and package food for freezing will be run August 1-3, in Salt Lake City as an activity of Intermountain Electrical Assn. Wayne R. Devenny is chairman of the committee of dealers and distributors. — Teach freezing

Duchess washing machines now is represented in California and western Nevada by John S. Cate, 242 S. Robertson Blvd., Beverly Hills. — Change

Gold E Distributors Inc. of San Diego gave up the Admiral line over inventory trouble. Admiral sent Michael J. Nicolin, former sales supervisor of Appliance Distributors, an Admiral owned subsidiary in Chicago, to be branch manager of a new distributing branch in San Diego. Gold E continues with its other lines. — Own distributor

Imagine a chain of five new appliance stores just starting now! It is being done in Hollywood by Al Haytin, Sam Nassi and Harry Blackman, owner of White Front Appliance Co. They figured this was a favorable time to start because they could start fresh and buy better. The stores are in Whittier, Alhambra, Palms, Compton and on Ventura Blvd. They call it the Flash Company. — Touch off flash

Manning Bowman, now owned by McGraw Electric, is to be handled by the latter's other appliance division selling organization, Toastmaster. Effective July 31 all representative territorial agreements terminated and Toastmaster takes over M-B distribution. — Absorbed

Little Giant tray washers are being manufactured again by a new firm in Hayward. Only limited distribution is contemplated at first until production increases. The J. J. Lukanish Co. has the first distribution, for northern California. — Reborn

Rumor has it, according to Tide, that RCA may soon go into the manufacture of white goods in addition to its electronic lines. — Well!

General Floorcraft Inc. is to offer a new General Twin 12 cleaner that is said to do everything from scrub floors to simonize cars. — Versatile

Seattle's Association of Appliance Dealers, under its twin chairmen, Tom Carmichael, Burns-Carmichael Co., and Jim Rench, Sherman-Clay, plans to start fall meetings and activities in September, says L. Ed Smith, secretary. Right now it is concerning itself with a new plumbing and heating code being proposed. — After vacations

Rheem Mfg. Co. seems to be developing a gas refrigerator, for it has engaged Henry Burggrabe, formerly with F. L. Jacobs Co. and other companies, to head up this work at its South Gate plant. — They've got it

Another model home with both adequate wiring and lighting has been opened to public showing in the San Jose area under the joint sponsorship of the Northern California Electrical Bureau and PG and E. The Bureau plans others in Santa Cruz, Salinas, Stockton, Santa Rosa, Sacramento and Redwood City soon. It is also aiding local units to sponsor joint displays with dealers at various county fairs in northern California. The main Bureau is up to its ears in the big show, the second Electrical Wonderland Exposition, Sept. 7-14, in San Francisco Civic Auditorium. The armed forces are giving remarkable cooperation — Lots doing

and will exhibit many hitherto unseen devices and weapons and electronic marvels.

Westinghouse is making available for odor dispelling purposes its tiny ozone-inducing lamp used in dryers and washers. — Room fixture

Despite devoting a fifth of its productive facilities to defense items Hotpoint has a strong program in many fields. For instance: A third printing of its powerful "Electricity versus Bottled Gas" is being made as demand for it grows. . . . A new low-cost self-trainer kit for appliance salesmen is being used to advantage by dealers. . . . A new sales plan to equip every school and college with all-electric test kitchens has been developed in which appliances are replaced yearly with new models. . . . A new manual for retail salesmen to be handled through utilities, with comparative tests on each type of appliance between bottled gas and electricity. . . . Is bringing into production an automatic non-clogging food waste disposal whose shredding mechanism rotates in either direction. . . . In its commercial line the defense program has opened new opportunities for sales for in-plant feeding and a program has been made for it. — Hot as firecrackers

A three-brush floor polisher, the Vactric, made in Scotland, is being introduced in America. Regional sales manager for 11 Western States is S. J. Heller, San Francisco. Lists at $69.95. L. J. Meyberg Co., F. B. Connelly Co., Radio TV & Appliance Inc., Prudential Distributors and Arizona Wholesale Supply handle it. — Thrifty

A nifty gadget, an automatic Klosit-Doorlite, made of Resinox plastic, is being made by Atlas Consolidated Corp. of Brooklyn. With a 12-ft cord its push button operates to turn on the light when the door is opened. Made to go on the inside door jamb. — Closet gimmick

Noma has developed a safety fuse plug for its Christmas lighting sets which it claims is the most important safety step since the electric lamp replaced the wax candle. Two tiny 5-amp fuses in the plug guard against overloads and accidental shorts. — Xmas safety

Spokane had its Electric Home of Today, with planned lighting, kitchen, laundry and wiring, opened July 28 through Aug. 5, at W 2513 Gordon, sponsored by Washington Water Power, G-E, Chamberlain Electric, Ken Moore Co. and Densow's. — Four features

San Diego Bureau of Home Appliances has issued its prospectus for its Electrical & Home Appliance Show, Nov. 23-28. — Shows how

Pentron, maker of magnetic tape recorders, Chicago, now has a tape player, without recorder, with which to play back recordings made on almost any recorder. Comes either with pre-amp only or as a complete player with amplifier and speaker, operating at either 7½ or 3 3/4 in. per sec. This anticipates a predicted issuance of music and other recorded tape by such companies as RCA. — Instead of platters

Naxon has improved and restyled its small washer, equipped it with a pump and makes available to go with it as an extra, a safe electric wringer. The washer retails at $69.95, the wringer at $16.95. It is portable and will fit under a sink. — Now a wringer

In stitches, Jack Moffatt, Free Sewing Machine general sales manager, appliance trade dinner chairman, and speakers Les Hoffman, Hoffman Radio, and Vale Freeland, Westinghouse Electric Corp., seem undismayed by the current business outlook

Color stopped them as Columbia's color wheel spun although there was no colorcast in San Francisco during Market Week. CBS-owned Air King and Tele-Tone showed color receiver sets and drew what market crowds there were to see demonstrations

Quiet Market Signals New "Normal"

It was a quiet market, the summer market at Western Merchandise Mart, San Francisco, even as the Los Angeles and Chicago markets had been. There appeared to be more salesmen than dealers or buyers. As one Fresno dealer put it, "I'm certainly getting a lot of attention, and it feels good."

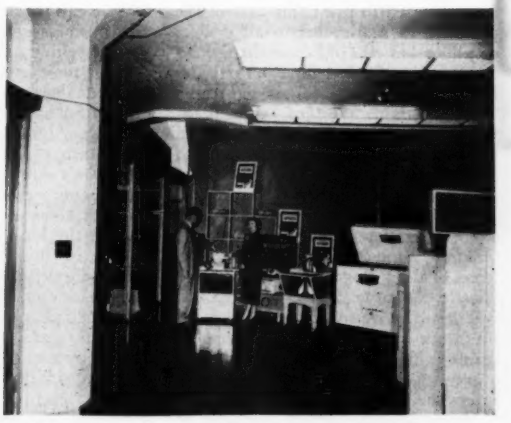
Opinions of distributors ranged all the way from "better than expected" to "lousy." Yet exhibitors with something dramatically new drew all the dealers who attended. (Mart management estimated that there were 10,000.) For instance, Servel, which showed its new line of electric refrigerators operated without motors, had a crowd and signed up many dealers and orders. The return of Little Giant tray washers was greeted with enthusiasm and orders at the J. J. Lukanish Co. space, where Gibson's new double-door refrigerator was taken for granted.

There were orders placed, many said, but they were modest orders, and for replacement, not for inventory. Dealers reported their inventories were in better shape but that selling really took work. Cutting prices hadn't made enough more sales to do it alone. For some new models the market was too early.

What the speakers had to say at the radio-television and appliance trade dinner, Wednesday evening, July 18, and at a press luncheon Mon-

(Continued on Page 96)

Servel switches to electric and the news brought more visitors than to most exhibits. A circus-like setting attracted Mrs. William Gianatasio, wife of Hale's San Jose store manager and Stan Broad of Servel explained how the new mechanism operates



Little Giant stages a come back as once popular Western-made tray washer reappears under new management. Don Lennard, general sales manager, and Dorothy Erickson of J. J. Lukanish Co., distributor, proudly show the washer in Market exhibit

Bill Cronin and Rick Birkholm answer the door shelves, butter compartment and automatic defrost obstacles salesmen run into in selling makes without these features

How to Develop Outside Selling

How dealers can develop business from former customers or users was one of the especially valuable features of the series of Frigidaire midsummer sales management conferences that was held during the month of June throughout the West. Permission has been granted to print this part of the program as a stimulus to all dealers of all makes of appliances in the interest of revived selling effort and improving dealer business generally. The Frigidaire Western regional office, under District Manager W. R. Buchanan, has given permission to ELECTRICAL WEST to share this information with other dealers.

A word first of these regional management conferences, of which one in Oakland June 28 was typical. Others were held in Los Angeles, Portland, Seattle, Spokane, Salt Lake City and Billings. The personnel presenting the programs in all cases was thoroughly trained in advance by the district organization and put on a similar program.

Harry Miller, branch manager of the Oakland district; C. R. Birkholm, sales promotion manager; William Cronin, Metropolitan sales manager; William Baldwin, appliance sales manager, talked down-to-earth business financing, salesmanship and the urgency to take to the field in salesmanship again to the managers and owners of stores who attended that meeting.

Baldwin concluded a straight-from-the-shoulder review of the answers to "What can we do to get more Frigidaire business" with a statement that outside selling activity was the greatest and most important selling activity a dealer could do. It applies to dealers no matter what size their operations. And then he delivered this ultimatum, "If you have salesmen who won't work outside perhaps you had better get some new salesmen. Perhaps they are not tough enough to take the kind of selling that is required in this 'normal market.' If your policy is such that you do no outside selling, it might be well to consider if that policy is the right one. Sure, it means more work all along the line but this business was built on specialty selling. There are no short-cuts."

Among the techniques used in outside selling, enumerated by Baldwin, was the program for using users. The following is taken directly from Frigidaire's sales management handbook as one of the guideposts for solving today's selling problems:

You, as a sales manager, recognize that the goodwill of your users has a vital bearing on your sales success, but have you taken steps to take full advantage of your users? Too often the contacting of users has been thought of only as a spasmodic activity. Even on this "hit or miss" basis the results have been excellent.

However, a well-planned "Use-the-User" program can lead to these *continuing* sales benefits for every dealer—

Using Users

Repeat Business—Due to the wide line of Frigidaire products, a user of one appliance is a prospect for many others.

Constant Supply of Prospects—If properly cultivated, satisfied users will supply a continual source of excellent prospects from friends and relatives.

Sell Your Salesmen on Using Users—As a dealer, you know that every satisfied customer is a gold mine for future sales. You must impress this fact on your salesmen by providing them with a complete planned program for using users to their best advantage.

What Is a Complete Program for Using Users?

Offer User Gifts—A gift makes it worthwhile for the user to prospect for you.

Contact New Users—Make call backs within a week on new users to

check on new equipment installed. By then they will have shown their new appliance to friends and neighbors. It's a good time to get new prospects and find out what the user's next purchase will be.

Check Up On Users Periodically—Assign each salesman a definite quota of users to be checked daily. Go through your user files to be sure every user is contacted. Be sure they are satisfied and be sure they are loyal to you. Require salesmen to keep an up-to-date record of what other products users need.

Check Neighbors — Require salesmen, when calling on users, to contact the next-door neighbors and the homes across the street.

Hold User Parties—Have users organize parties for their friends, in their home or in your store. Demonstrate products as you entertain. You furnish the meal—your users will furnish the prospects.

Personalize Your User Direct Mail—Direct mail is an excellent way to keep users informed of new user gifts or of new products. Use personalized post cards with a picture of the salesman and a "Remember Me?" message. Invite users into your store. Send users new product literature.

Sell with Testimonials—Every salesman's album or portfolio should contain the names of (Frigidaire) users in your town, as well as reproductions of outstanding testimonial letters. The list of names should be by geographical location so they can be called to the attention of prospects in the same neighborhood. Have your salesman ask for testimonials—that's all it takes to get 'em.

Display Your Users — Display in your window or in your showroom a large map of your community pin pointing every home containing a Frigidaire product. It's an effective display for your store's and Frigidaire's popularity.

Follow-Up Promptly — Distribute prospect information to salesmen quickly. Have salesmen make a report on every prospect. Reward users immediately when sale is made.

How to Get Repeat Business from Time Payment Customers

When a time payment contract is paid out, your customer will quite often be ready to purchase another Frigidaire product. Under the conditions of Regulation W, it is necessary to first collect the down payment on the new product before a new contract can be written. However, your customer is accustomed to making monthly payments and, by having her continue them until the down payment is accumulated, you can get the sale.

If you work with GMAC, three types of "paid-out" notifications are available and we suggest that you arrange with them, or whichever finance company you use, to always notify you of a completed contract so that you know when your user is an "add-on" prospect.

Time payment cutsomers are also especially interested in earning extra money. Give them a chance by incorporating them in your User Reward Program.

What About Boosters?

Besides your users, you can create many other *"boosters"*—people who know of prospects and will tell you about them for a cash reward or an appropriate gift.

Any of the methods used to get sales-producing leads from users can also be used with "boosters." Boosters, especially groups, are more likely to be interested in a cash reward than in a gift, however. Here are your best booster sources:

At Mass Demonstrations—Explain your Booster Reward plan at mass demonstrations. While only a limited number of an entire audience is interested in actually buying a product, a considerable portion of the audience will know some one who *is* interested. Take advantage of the fact.

Organizations—Church and fraternal organizations, civic groups, PTA groups, granges and other organizations that usually solicit for funds can form excellent booster teams if you let them know how easy it is to earn extra cash through your booster reward program.

Low-Income Groups and Students—People with low income—especially high school students — are always wanting extra cash. Let them know how they can earn it from you. Have salesmen place an ad in the classified section of the local newspaper or school newspaper asking for prospects and offering a "reward" for those that result in a sale. Watch your booster activity pick up.

Anybody Can Be A "Booster"!—Users are *customers* only when they *keep buying* their appliances from *you*. You must continually contact them and cultivate them to make sure they *remain* customers.

Free Trial

It has often been said that no one can sell a good product as well as the product itself—that's the basis of free trial. Free trial puts a salesman constantly in the home and there are few prospects who can resist the "sales appeal" of an operating product. Besides increasing your sales, here's what free trial can do—

Build confidence and increase income of new salesmen.

Enable salesmen to use them more effectively.

Encourage salesmen to work at night when husband and wife are home.

Eliminate competition and "shopping around."

Offer "proof" to ice users that owning a refrigerator is cheaper than buying ice.

Can be used on all appliances except water heaters.

Who Are Prospects for a Free Trial Demonstration?

Practically any prospect who is interested in the product, and who has a good credit rating plus the ability to raise the down payment is a qualified prospect for a free trial demonstration. While many dealers have felt that the lower income segment of the market was the only logical place to try free trial, it has been proved that prospects of any income level are attracted by a free trial offer. During these days of high down payment requirements, qualifying the prospect is highly essential. By trying free trial in the better sections of town, you almost automatically qualify your prospect credit-wise.

In order to keep a maximum number of products on trial, we suggest you locate prospects by canvassing or other means of locating a quantity of good prospects. Also, free trial is an "ace-in-the-hole" in *closing* sales when other selling methods have failed.

What Are My Sales Management Duties in a Free Trial Program?

Hold a meeting with all personnel involved and thoroughly discuss all phases of your free trial plan.

Hold check-up training meetings at frequent intervals.

Publicize and advertise your free trial offers—never lose a sale without trying free trial.

Give each salesman a definite quota of products that must be out on trial at all times.

In cases where the salesman fails to close, see that the product is not returned until you or your sales supervisor have tried to close.

Have salesman on hand for each trial installation or immediately afterward to demonstrate use of product and try for early close.

JEFFRIES

TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY

1710 E. 57th St. Los Angeles 11, Calif.

ALL the strength and durability inherent in steel are combined—with definite economies—in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE INDIANA

Use films to sell in the home if necessary.

As products are sold place others on trial at once—keep your free trial program active and keep the number of products on trial constant.

What Are My Salesmen's Duties in a Free Trial Program?

Qualify the prospect for desire, ability to pay, model needed, location of installation and the equipment needed to make a temporary installation. This usually necessitates a visit to the home.

Make installation appointment and get the unit installed as promptly as possible.

Be on hand when unit is installed to see that everything goes right. Try for an early close—the best time being in the evening when husband and wife are both home. Invite prospect to ask neighbors in for installation demonstration.

Attempt to close within a reasonable time and report all failures immediately to you or the sales supervisor.

Check back to see that permanent installation is satisfactory and that correct use is understood. Check user for additional prospects.

Can Free Trial Be Offered with Used Products?

Definitely—in fact, it is a forceful way of showing interested prospects that you have confidence in the quality of the user product you are selling. Such a trial offer can often lead into a similar trial offer on a new product.

What Are Other Dealers Doing That's New in Free Trial?

There are a few free trial "service twists" that have proved very successful:

Several dealers have loaned new refrigerators to service customers while the old refrigerator is returned to the shop for service. In most cases the old refrigerator is taken in trade.

Some dealers are featuring a "Refrigerator Accommodation Plan" whereby they lend a new refrigerator to a prospect while they recondition or check the old. Before completing repairs, they try to sell the "loaned" product.

Handling Free Trial Demonstrations Under Regulation "W"

Regulation "W" puts in writing what is only good business practice—that the product on trial must be sold within 10 days or be returned to you.

Quiet Market

(Continued from Page 93)

day, was realistic but not defeatist. They acknowledged that the going was rough, for a variety of causes, but had lived with the business long enough to feel that it had survived many such slumps, emerging each time bigger than ever.

Jack Moffatt, general sales manager of Free Sewing Machine Co., admitted being knee deep in machines, but the small portable they had brought out to compete with foreign makes, selling at $49.95, is over 7,500 back ordered already. This proves, he said, that the public wants reasonably priced appliances of real value. He predicted that by Labor Day there would be a revival of buying interest.

Vale Freeland, Westinghouse manager of department and furniture store sales, Mansfield, upheld selling pressure as the bringer of all progress. He reminded of the days when washing and sewing were done by hand and contrasted those preselling days with today. He also recalled how some appliances said to have saturated their market emerged with new features and sold by the millions. Already the appliances sold in 1945 are obsolete and replacement makes a tremendous market. The cure for today's ills, he said, is more pressure.

H. Les Hoffman, president of Hoffman Radio & Television Corp., revived lagging dealer enthusiasm for television with his own sincere belief in its possibilities and future. If it has grown to a billion dollar business already with only 107 stations, no government subsidy, and a freeze, what will it do when there are 1,800 stations? He ran through the technical problems: the freeze, color, UHF, prices, shortages, sales policy; giving simple, straightforward views on each. The freeze will be off in 1952. The tremendous production capacity of the nation needs the TV medium to sell its goods, so he felt 1,000 stations could be supported by advertising. He saw no future in subsidized TV by consumer fees and a gadget. Color will come electronically and the present wheel system will not sell. UHF can easily be adapted.

● **Triple Appliance** — Broil-Quik Trio, a new appliance that broils, grills and fries simultaneously by means of infrared electric heat has been introduced by Broil-Quik Co., 2330 Fifth Ave., New York City. It carries the UL label.

Eyes Right!

RIGHT LIGHTING

● The eyes have rigid requirements in efficient lighting. Smoot-Holman certified illumination meets those requirements with unvarying quality and performance created by superior engineering and skill. Beauty, high efficiency and dependable operation are the hallmarks of the finer lighting equipment that bears the Smoot-Holman label in institutional, commercial and industrial installations.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA ®
MADE IN U.S.A.

OFFICES IN PRINCIPAL WESTERN CITIES — BRANCH AND WAREHOUSE IN SAN FRANCISCO

Typifying good labor relations is this group at NECA Billings conference: William Blackmar, Montana Chapter manager; William Howell, National Electrical Benefit Fund secretary, Washington; Wallace Wright, IBEW vice-president; "Mutt" Thompson, IBEW representative; Bob Rowe, president, Montana Chapter, NECA

District 8 NECA Favors Joint Meeting

It is the small contractor who needs most the services and the exchange of ideas and information that an association provides, particularly in an area of widely separated towns. This was the keynote of the practical and realistic talk given by Ralph Johnson, NECA vice-president for District 8, at that district's third annual meeting, in Billings, Mont., June 21-23. Some 75 contractors converged from Utah, Idaho, Colorado and Wyoming on the Montana city, which played host to the National Electrical Contractors Assn. Montana Chapter, led by R. D. Rowe, Rowe Electric, Great Falls, president, and William Blackmar Jr., manager, outdid itself to make the contractors and their wives welcome.

The conference got off to an unfortunate start Thursday afternoon, at the Northern Hotel, when a poor attendance or perhaps a boycott of line construction contractors made the long trips of George B. Shetky, Western Electric Construction Co., Portland, chairman of the Northwest Line Constructors Chapter, and Gerald Petersen, Petersen Engineering Co., San Francisco, president of the California-Nevada Chapter, disappointing. It had been intended to exchange views with Montana and Rocky Mountain area contractors on problems relating to this type of work and two BPA color movies, *Hi-Line* and *Stringing and Sagging*, were shown.

From Friday on the meeting was well attended and on the beam. It began with a luncheon at Yellowstone Country Club, at which H. C. Porter, president of Billings Business College, spoke. His subject, "Mental Indigestion—Four Out of Five Have It," dealt with the need for intelligent business preparation to face the complex difficulties of running a business these days.

Ralph Johnson, Sturgeon Electric Co., Denver, the district vice-president, spoke of the value of district meetings to the contractors, particularly the so-called small contractors, whose needs for information, counsel, assistance is even greater than that of contractors with large organizations that give them these services. With wide separation of towns and cities and a small total number of contractors, the national association affiliation is more needed than ever.

In a later summary of the conference, Johnson said there are too many contractors who seldom attend meetings or participate in its work. They only come to it in time of trouble to bail them out of some difficulty. While the association exerts every effort to help in such cases, he said, it is no mere fire department. An association succeeds only when its members work together on committees, assisting and guiding the chapter manager who, though paid to serve the members, cannot by himself accomplish everything asked of him. Often the prestige of the contractor members themselves in dealing with a situation is the strongest asset the manager has with which to accomplish results for the entire group.

Importance of selection of a contractor who will sincerely function as the governor for the chapter was emphasized by Paul M. Geary, executive vice-president of NECA, Washington, D. C. Geary reminded that if the NECA is to remain a democratic organization, responsive to the needs and wishes of its members, the governor must truly represent the chapter and its members on the NECA board of governors where the policy for the association is decided.

Hence a chapter should be sure to elect a man willing to assume such responsibility and to work at it. He should take an active part in the chapter activities and policy making and in that of the NECA board of governors. In many cases the president of the chapter serves as governor too, which is permitted.

Although governors are elected each year, a man who is a good governor can and should be re-elected to carry over experience and knowledge of policy. The board of governors is the congress of the association.

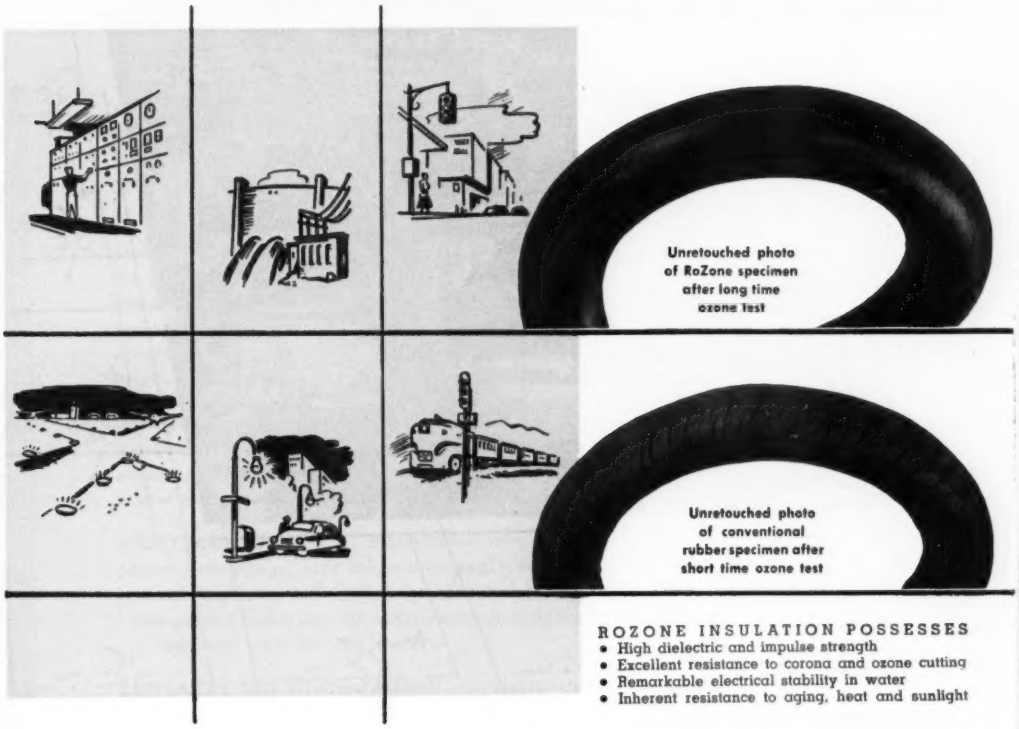
Geary also reported on the details of CMP-6 relating to construction and on other government orders and regulations. Members are being informed of these constantly by the association's bulletins and newsletter. He urged contractors to try to get work on approved projects as other construction is slowing to a halt and many contractors already have used up their supply of materials and had to go out of business. Membership figures have reflected this situation, he said.

After speaking of cooperation between management and labor within the electrical industry, W. C. Wright, vice-president, International Brotherhood of Electrical Workers, District 8, suggested that NECA and IBEW hold their district meetings at the same time, as is done in District 5. Since the officers of each attend the other's meeting, he said, it calls for costly duplication of travel expense. Attendance at joint meetings would be greater and separate business sessions held by each organization would provide time for discussion of special problems in closed meeting.

Rome RoZone

THE SUPERIOR OZONE-RESISTANT INSULATION

adds years to cable life...


Unretouched photo of RoZone specimen after long time ozone test
Unretouched photo of conventional rubber specimen after short time ozone test

ROZONE INSULATION POSSESSES

- High dielectric and impulse strength
- Excellent resistance to corona and ozone cutting
- Remarkable electrical stability in water
- Inherent resistance to aging, heat and sunlight

The photos above tell their own story. At the top is RoZone insulation after being subjected to an ozone atmosphere for a period well in excess of specification requirements. Note that there is no deterioration of compound... no surface checking. Below is conventional rubber insulation after a much shorter ozone test. These unretouched photos demonstrate clearly the superiority of RoZone under conditions of ozone cutting when higher voltages are involved . . . all of which means longer service life and greater dependability.

Specifying RoZone pays off on many installations. For example, high voltage power circuits... station or supervisory control signal cables... street lighting cables... airport lighting and control cables as well as general purpose wiring where high quality and long life is paramount.

Copper wire mill products are a Controlled Material under N.P.A. Controlled Materials Plan. USE YOUR CMP ALLOTMENT.

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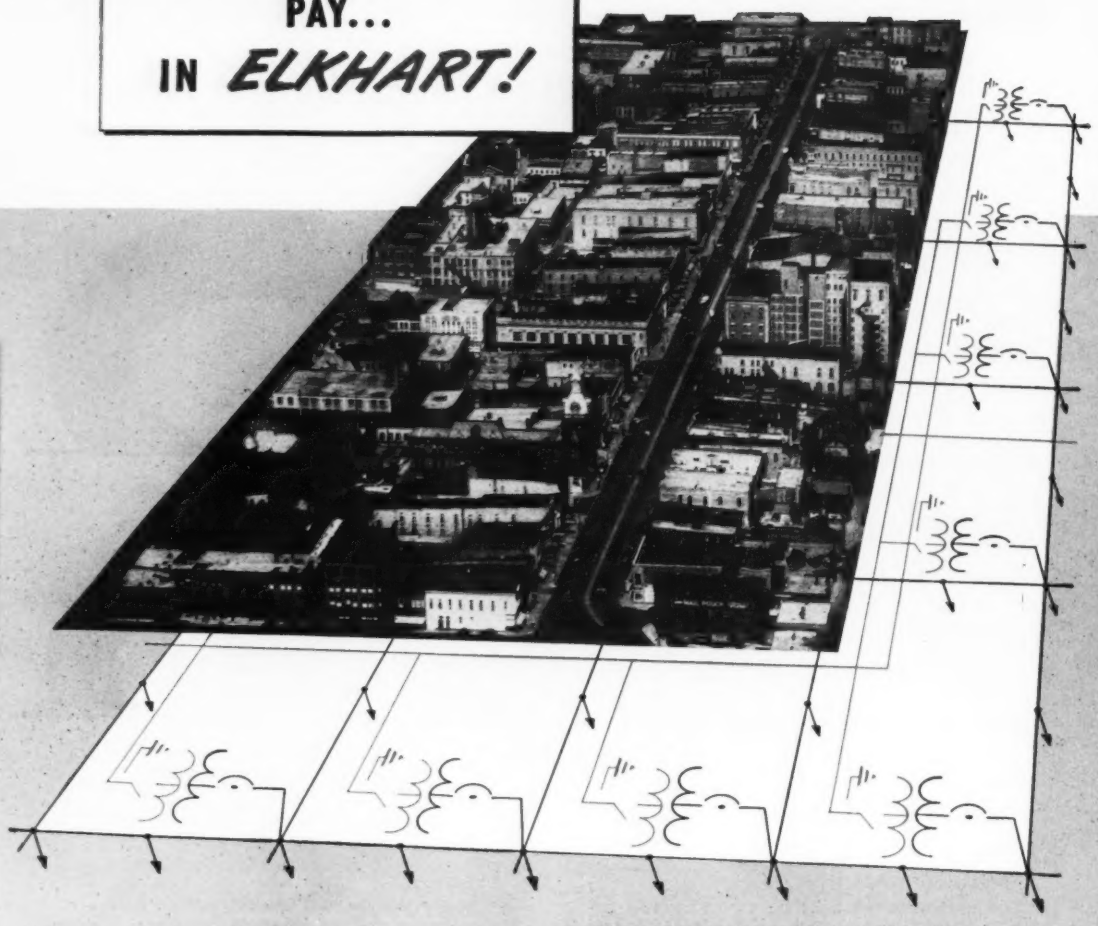
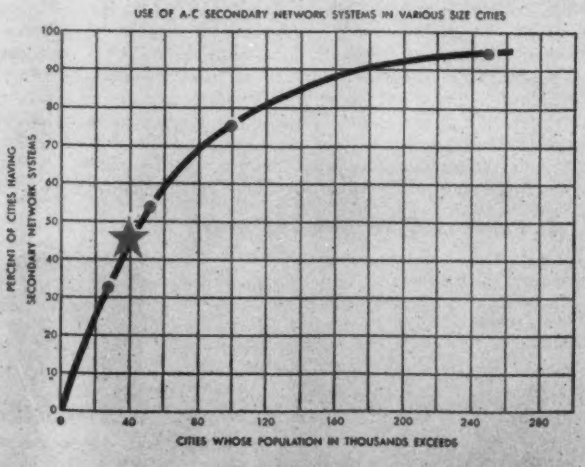
NETWORK SYSTEMS PAY... IN *ELKHART!*



FACTS ABOUT ELKHART'S A-C SECONDARY NETWORK SYSTEM.

The secondary network system is supplied from 13 vaults having a total capacity of 3,900 kva. The area covered by Elkhart's network is almost 20 square blocks, containing 3.61 miles of conduit, 5.47 miles of primaries and 2.27 miles of secondary feeders.

One third of all cities in the United States with a population of 25,000 or more have network systems, while one half of all cities with a population of 50,000 or more have network systems.



17 years' uninterrupted service... no voltage-regulation problems

There's no power service problem in the business district of this bustling Indiana town of 40,000 . . . they took care of that 17 years ago. Then, Elkhart was struggling with an overloaded radial system, consisting of 3-phase primaries and both 3-phase and single-phase secondaries . . . tranformers were mounted on practically every pole. The Fire Department and fire underwriters were concerned . . . the utility was plagued with voltage-regulation problems.

OVER AND UNDER . . . In 1934 the Indiana and Michigan Electric Company met the problems of Elkhart's business district by installing an *A-C Secondary Network System.* Transformers and primaries were placed underground . . . the secondaries and services overhead. This overhead and underground combination, particularly applicable to smaller cities and towns, made possible great economy in the original installation cost.

IMPROVED SERVICE . . . The A-C Secondary Network System has resulted in a high standard of continuity of service and uniformly good voltage-regulation, not attainable through radial distribution systems. Underground placement of the primaries and transformers has greatly reduced congestion and improved appearance.

ABOUT MAINTENANCE . . . Maintenance story here is typical of all users of secondary networks . . . it's low, almost negligible. The utility reports that in 17 years of operation, there has never been a complete interruption of the system. Underground crews like the convenience of maintaining the system. They know . . . they work with the equipment.

CUSTOMERS AND UTILITIES BENEFIT . . . Utility customers appreciate the high-quality service and uniformly good voltage-regulation afforded by network service. The utility benefits from reduced operating and maintenance expense and improved customer good will. Large or small, your town can have high-quality network service . . . at a cost commensurate with the benefits this service affords. Westinghouse makes this equipment and can help in your planning. Call or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-97155

YOU CAN BE SURE... IF IT'S Westinghouse

NETWORK EQUIPMENT

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

A vote was taken by the group and the next district meeting, in June of 1952, will be a joint meeting with the IBEW at Colorado Springs.

Hugh I. O'Keefe, district director, OPS, Helena, and Sidney T. Smith, branch chief, Helena, spoke on price control and endeavored to answer questions, but could not answer the one the contractors really want answered, whether they are permitted to increase their prices to cover pay raises granted since the base period. On Saturday Frank W. Fuller, industrial analyst, NPA, Minneapolis regional office, discussed the control of materials and CMP program.

"Power Up and Be Prepared," the Anaconda program for electrical contractors, was presented by Albert W. Tracy, district manager, Anaconda Wire & Cable Co., Denver. He pointed out that nine out of every ten industrial plants are inadequately wired and that modernization of their equipment to enable them to speed up defense production is the contractors' opportunity in the present limited construction period.

Gar Morse, Western director of sales, San Francisco, and C. A. Dickinson, division manager, Seattle, Sylvania Electric Products Inc., presented the Sylvania "Qualified Lighting Contractor" program, first as luncheon speakers on Saturday, then with slides, at the afternoon session. This, too, was presented as an opportunity for contractors to develop lighting maintenance business as well as make the original installation. A full portfolio of sales aids and advertising pieces to use was offered each contractor.

NECA's own program of education for contractors was reviewed by E. R. Cornish, former Western director, now director of research and education, Washington, D. C. Cornish announced that the association had decided to run the program itself instead of carry it on through ICS and that the first course, that on accounting, would be available Aug. 1. Enrollments for it are now being made. The course is designed to be taken either by correspondence or in groups organized by the chapters and in cooperation with a business education leader furnished by the public schools.

From one of the West's most successful chapter managers, Don Larson of the Rocky Mountain Chapter, with branches in Denver, Colorado Springs, Pueblo, Cheyenne and Casper, came a sound, practical talk on "How the Contractor Can Use Chapter Services." He boiled down the three basic services that a chapter can perform for members as: (1) pooling and exchange of information; (2) service on labor relations and related matters such as apprenticeship training; (3) public relations. The last, he said, whether contractors appreciate it or not, is the most important. It deals with the contractor's relations with the industry, public utilities, inspectors, dealers, and customers. He showed how the programs of education and promotion benefit the contractor, and mentioned the Power Up, the Adequate Wiring, Planned Lighting, and similar programs and the technical assistance joint programs with architects, engineers, utility and inspectors.

Comedy, not programmed but appreciated by all, was introduced when Curley Scherzer, Curley-Naylor Electric, played handyman, wiring an outhouse for customer Roal Larson, Billings Electric. Wally Wright, IBEW vice-president, business agent, demanded Curley show union card

A report on the pension program, the National Electrical Benefit Fund, operated jointly with IBEW to contribute to pensions for retired IBEW workers, was made by W. D. Howell, assistant secretary-treasurer of the fund, Washington, D. C. Realization has come to the IBEW, it was revealed, that its original pension program had not been set up on an actuarially sound basis and that as numbers of pensioners increase the funds with which to pay pensions may soon be exhausted, even with the contribution of a matching amount from electrical contractors. The IBEW has recently increased its assessment on members to increase the fund. There was no immediate suggestion that the contractors increase the 1% of labor pay roll they now contribute, but a resolution was passed urging IBEW to make arrangements to collect a similar 1% from employers of Class A or benefit-eligible electrical workers in maintenance, general contractor, utility, or other contracts.

Matt Sherwood, director, Western regional office, NECA, San Francisco, recommended to the chapters of the Rocky Mountain region that a conference of chapters be formed, similar to the California and Northwest conferences, to meet quarterly and thus achieve better coordination of their local or regional problems.

Besides the resolution referred to on enlarging the scope of contribution to the benefit fund, three other resolutions were passed: one asked NECA headquarters to continue trying to get the inequities of OPS CPR-34 cleared up as to passing on increased labor rates; one to have NPA recognize that the orders such as M-12, M-7, are not applicable to stocking, buying or using of materials in the economical operation of a contracting business; and one of thanks to the Montana chapter for its hospitality.

The conference ended with a banquet addressed by Dr. Gordon Volkenant of Montana State College, whose talk, "World of Tomorrow," opened new horizons as to the applications of electronics to all phases of life and industry.

A breakfast meeting of the governors and chapter managers provided a forum for discussion of chapter management details. Bob Rowe, president of the Montana Chapter, on the regular program, asked all for suggestions as to chapter operations and activities and there was considerable discussion from the floor. One of the most important points made was that in a new chapter such as Montana's the establishment of stability and recognition was very important; that when contractors felt assured it was no fly-by-night organization, they would be willing to affiliate with it and participate in it.

Charles Simpson of Cheyenne and W. P. Robbins of Salt Lake City shared the chair with Rowe in running sessions of the meeting; and the wholesalers and Montana Power tendered the delegates a cocktail party Friday evening.

● **Seventh regional conference of the Institute of Radio Engineers was held in Seattle, Wash., recently. One of the features was an explanation of the special problems involved in the development of a 30-in. television receiver by William C. Platt, DuMont Laboratories. Giant size picture tube with 90° deflection angle and necessary extra high voltage circuits presented special problems.**

Here's Why VICTOR Guy Strains NEVER LET YOU DOWN!

THEY'RE STRONG! VICTOR'S de-airing process produces porcelain of maximum density and tensile strength.

THEY'RE MADE OF HIGHEST QUALITY WET PROCESS PORCELAIN designed and manufactured to give unequalled mechanical and dielectric characteristics.

THEY'RE INDIVIDUALLY INSPECTED at every point of manufacture, one of many reasons why VICTOR Guy Strains are famous for durability and long service!

THEY'RE QUALITY CONTROLLED! All shipments of flint, feldspar and clay used in VICTOR Guy Strains are stored in separate bins and tested for quality and uniformity before using.

SMOOTH, HARD GLAZE protects them against weathering and contamination—cuts maintenance and replacement costs.

VICTOR NO. 504 GUY STRAIN INSULATOR. For complete engineering data on this insulator and other sizes and types, write today for Bulletin No. 4.

VICTOR Guy Strains are better because our engineers, technicians and craftsmen have the "know-how" to make them better! Each one is made with the same high grade materials and careful workmanship as are VICTOR's famous high voltage insulators. That's why more and more power companies are specifying VICTOR Guy Strains—the standard of the industry.

Do You Know that...

VICTOR is one of the largest manufacturers of spools in the country? They, too, are made of genuine VICTOR wet process porcelain. Every one is made to close, rigid tolerances to fit perfectly the proper rack or clevis.

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GUY STRAIN AND SPOOL INSULATORS

VICTOR INSULATORS, INC. VICTOR, N. Y.

Quick Catch-up

Contractors

R. Beaumont has been re-elected for the fourth term as president of Vancouver Electrical Assn., the contractors organization. J. Grumey was elected vice-president; R. Sutherland, treasurer, and S. C. Murkin, secretary; T. Eymundson, S. Vey and C. S. Goddard new members of the executive to serve with L. Sewell, R. Wallace and R. Hall. The organization, in its 20th year, has grown from about 25 contractors to over 300 and now requires two full-time men to handle the business of the association.

NISA

Puget Sound chapter elected Carl Lundberg, Cascade Machinery Co., Seattle, as its chairman recently, and Harry G. Brown, Seattle Electric Works, secretary-treasurer.

RETA

Al Clarke has been elected president of the Radio Electronic Technicians' Assn., Vancouver Chapter. Other officers appointed are E. Mullens, vice-president; F. Lewis, corresponding secretary; H. Amos, recording secretary; and W. Wheatcroft, treasurer.

IRE

A seventh annual Pacific Electronic Exhibit will be held in the Civic Auditorium, San Francisco, Aug. 22-24, in conjunction with the convention of the Institute of Radio Engineers. The show is sponsored by the West Coast Electronics Manufacturers Assn.

Electric Clubs

H. R. "Hank" Loew, General Electric Co., Apparatus Department, Seattle, was elected president of the Electric Club of Washington at the last scheduled meeting for the past fiscal year. John M. Nelson, Seattle City Light, was named first vice-president; C. D. Casey, Casey Electric Co., second vice-president; R. A. Church, Puget Sound Power & Light Co., treasurer. Loew succeeds R. B. Lane of Industrial Electric Co. Trustees named also were G. A. O'Brien, Phelps Dodge Products Corp.; H. L. Mote, Graybar Electric Co.; W. D. Trudgian, Westinghouse Electric Corp.

John L. "Jack" Tindale, Anaconda, is 1951-52 president of the Los Angeles Electric Club. A naval reserve officer, he served in the Southwest Pacific during World War II. He succeeds A. H. Howard

Jack L. Tindale, district manager, Anaconda Wire & Cable Co., was elected president of the Electric Club of Los Angeles for the new term which will begin in the fall. He will begin the 31st year of the Los Angeles Electric Club. He succeeds A. H. Howard, Tri-State Supply Corp., who now goes on the executive committee. Other officers are I. L. Bateman, Department of Water & Power, first vice-president; R. G. Kenyon, Southern California Edison Co., second vice-president; R. E. Johnson, General Electric Co., third vice-president; Carlisle Bailey, Newbery Electric Corp., secretary-treasurer; Reed O. Christiansen, Pacific Electric Railway Co., sergeant-at-arms; and executive committee, Howard; S. M. Johns, Westinghouse Electric Corp.; Marshall C. Wells, Sues, Young & Brown Inc.; D. G. Kendall, Square D Co.; and E. E. Karsten, Gough Industries. Among recent electrical industry speakers to address the club were J. Harold Foote, president, Commonwealth Associates Inc., New York, who was in Pasadena for the Electrical Equipment Committee of Edison Electric Institute; H. E. Dryden, directory manager, Pacific Telephone & Telegraph Co.; and Albert Cage, president, California Electric Power Co., who spoke on cloud seeding to produce rain.

IAEL

Dates for the annual conference of the International Assn. of Electrical Leagues which will be held in New Orleans are Oct. 10-13.

AIEE

The Pacific general meeting of the American Institute of Electrical Engineers is scheduled for Portland, Ore., Aug. 20-23, following the summer general meetings of the Institute. It will be held in the Multnomah Hotel, with inspection trips to Bonneville power house. Charles B. Carpenter, PT&T, is chairman of the arrangements committee and M. M. Ewell, Westinghouse Electric Corp., vice-chairman. W. E. Enns, G-E Co., heads the technical papers committee and O. A. Demuth, of BPA, the inspection trip. Charles F. Dalziel, professor of electrical engineering, University of California, presented a paper on insect light traps at the Toronto meeting of the institute.

Victoria Electric Club elected A. B. Food of Fletcher Bros., president of the Victoria Electric Club. W. C. Mearns of the B. C. Electric Railway Co. was named vice-president, with R. W. Patrick as secretary. A. W. Jensen is treasurer. Directors of the organization are S. E. Jarvis, T. Mawson, F. E. Waring, A. Button, W. Mais, and A. W. Lutes. Major "Arch" Archbold, former Vancouver Island representative for the Electrical Service League, who has just returned from duty as military observer to the United Nations Commission in Pakistan and Kashmir, was the guest speaker at the annual meeting.

E. K. Sadler of Kelman Electric & Mfg. Co., Los Angeles, was appointed chairman of the Los Angeles Section, American Institute of Electrical Engineers, at its recent election. E. W. Rockwell, Metropolitan Water District of So. Calif., the former secretary-treasurer, was made vice-chairman and C. A. Well, Pacific Telephone & Telegraph Co., made secretary-treasurer. Peter Duyan Jr. is chairman of the aircraft division, F. M. Dorey electronics division and H. E. Jung of the power division. The executive committee consists of George R. Best, membership committee chairman; Dr. G. D. McCann Jr., student relations committee chairman; W. S. Peterson, reception committee chairman; and G. R. Woodman, arrangements committee chairman.

For the Boulder City subsection of the Los Angeles Section, F. A. Latham, Department of Water & Power, Boulder City, was elected chairman; L. J. Hudlow of Boulder City, vice-chairman; Frank G. Scussell, secretary-treasurer; Clarence F. Newman, membership chairman; and G. L. Barneby, member at large.

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1. HOW MUCH EXTRA CURRENT CAN YOU ADD TO EXISTING RACEWAYS?

Size for size, Deltabeston* AVA cables carry more current than ordinary cables—pack more current into raceways—because heat-beating asbestos insulation permits higher operating temperatures. When you specify G-E Deltabeston cables,
HOW MUCH CURRENT CAN YOU ADD?

2. WHAT REALLY MAKES THE DIFFERENCE IN CONDUIT?

Wiring installations get double-protection with General Electric White rigid conduit. First, the top-quality, thoroughly-tested steel pipe is galvanized. Then a tough, smooth coat of Glyptal* lacquer is applied.
BUT WHAT REALLY MAKES THE DIFFERENCE?

3. WHAT IS THE TESTED LIFE OF A G-E MERCURY SWITCH?

The silent General Electric mercury switch has no moving blades or contact springs to wear out—a pool of mercury does all the work! Mercury switches provide exceptionally long service—
CAN YOU GUESS HOW LONG?

4. WHAT'S THE NEW STANDARD GROUNDING OUTLET?

For easy installation the new standard G-E twin grounding outlet can be side wired or back wired, but
WHAT'S THE NEW STANDARD?

5. HOW DO YOU POSITION A BOX EXACTLY WHERE YOU WANT IT?

Positioning a box exactly and bringing it to the exact level is now an easy job with the new G-E bar hangers.
HOW'S IT DONE?

ANSWERS

1. ☐ G-E Deltabeston AVA cables can add as much as 64% more current-carrying capacity than ordinary cables with 60 C rating.

2. ☐ G-E White rigid conduit is *hot-dip galvanized* in pure zinc—a premium finish that gives lasting protection.

3. ☐ In laboratory tests General Electric mercury switches stand up under more than a million On and Off cycles—about 247 years of normal use.

4. ☐ The new standard grounding outlet (GE3588) is designed to take three-prong grounding plugs, two-prong polarized plugs, and regular two-prong parallel-blade plugs.

5. ☐ The new line of G-E bar hangers offers you the offset you need. New design lets fixture stud move easily for leveling and positioning, locks it tight when it's set.

FOR FURTHER INFORMATION on any General Electric wiring material, see your local G-E Construction Materials Distributor, or write to Section K53-825, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

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GENERAL ELECTRIC

THE MONTH IN BRIEF

Tacoma Dams Given Adverse Report

Tacoma has had another rebuff in its attempt to secure a license for two dams on the Cowlitz River. William J. Costello, FPC examiner, recommended in Washington, D. C., last month that no federal license be granted for the dams. The city's application is in conflict with the government-approved plan for conserving the Cowlitz resources, Costello said, and the Army Engineers explicity eliminated that river from its 1949 recommended construction schedule in the Columbia River Basin. Granting the tight power supply in the Pacific Northwest, he said that Tacoma will be able to secure adequate power for its future needs because it is a preferred customer of Bonneville Power Administration. The city has proposed to set aside $7 million for special fish passage facilities, which opponents of the project contend may not work.

Senator Cain May Fight Adverse Ruling

Acceptance by the FPC of its examiner's report against Tacoma's Cowlitz project could touch off a congressional fight endangering future power appropriations, according to Senator Harry P. Cain of Washington, a member of the appropriations committee. Cain, on a visit to his Tacoma home last month, said that he might carry the matter to the Senate floor. When Congressmen are apprised that two nonfederal projects (Cowlitz and Pelton) representing 500,000 kw of power are being denied, they are going to rise in their wrath and say that not another dime of federal money is going to be spent on Northwest power programs, Cain is quoted as saying.

BPA Studying Cloud Seeding

An exploratory survey of cloud-seeding to increase runoff into Northwest reservoirs from September through March is provided in a $7,500 contract between Bonneville Power Administration and the Water Resources Development Corp. of Denver. The contract (limited to Pend Oreille, Clark Fork and Flathead river drainage basins) calls for no actual rainmaking. It requires the corporation, directed by Dr. Irving P. Krick, to survey all topographical, hydrological and geographical factors involved, as well as possible effects on property and other economic interests. If BPA considers the operation feasible, the program will be explored with other federal agencies, Northwest utilities and interested groups, BPA Administrator Raver said. About 360,000 kw could be added to the federal system, if winter flow of the Columbia at Grand Coulee could be maintained at average or better, Raver estimates.

Rainmaking Licensed in California

Bills regulating and licensing artificial rainmaking and appropriating $50,000 for research in artificial production and control of rainfall have been passed by the California legislature and signed by Governor Earl Warren. (See page 112.)

Northwest Power Users Studied

Power shortage in the Pacific Northwest will reach the critical point this year, according to C. A. Erdahl, Tacoma public utilities commissioner and chairman of the Northwest Utilities Conference Committee, who predicted last month that 5,000 workers in the Puget Sound area could lose their jobs temporarily as a result. Erdahl has passed on to power distributors in the Northwest a DEPA request for lists of industries where power could be shut off next winter with the least harm to themselves, the area economy and the defense effort. First to be cut off would be users of 300,000 kw of interruptible power. A reduction up to 300,000 kw of firm power would follow, if necessary. Lack of rain during the spring and summer, combined with unusually warm weather has reduced water in Northwest reservoirs.

Steam Plants Possibility for BPA

Steam plants as a short-term answer to the demand for more power in the Northwest are being considered by Bonneville, according to reports from Washington, D. C. A bill may be drawn up to permit BPA to build three steam plants on the fringes of its present system. (See story on page 116.)

Plenty of Power for Southern California

Curtailment of power from Hoover Dam will have no appreciable effect on southern California's power supply, Southern California Edison Co. and the Los Angeles Department of Water & Power have assured their customers. Both utilities expect to make up any shortage of supply with steam generation. (See page 116.)

Ordinance Covers Refrigeration Systems

An ordinance regulating installation, alteration and repair of mechanical refrigerator systems has been passed unanimously by the Seattle City Council. The city health department helped prepare the ordinance in cooperation with the refrigerator industry, labor unions, hotels, restaurants, taverns, food stores and other lines of business affected.

OPS Enters Rate Hearing

OPS last month entered a rate increase hearing before the California Public Utilities Commission. Bryce Rea Jr., OPS interviewer, said that the government agency was not protesting the increase but desired to present new considerations on what it felt was a fair rate. The case was one in which California Electric Power Co. was seeking a general rate increase of 14%. The company told the PUC that, unless it secures new capital for additional power development, it will be unable to provide adequate service for new business needs.

For transformers...
inhibited oil
or non-inhibited oil

Manufacturers say
INHIBITED

At the October 1950 meeting of the Edison Electric Institute in New York, leading manufacturers of electrical equipment announced their intention to switch to oxidation-inhibited oil for transformers, switchgear and other equipment manufactured by them.

Experience of users says
INHIBITED

Southern California Edison Co., Los Angeles Department of Water and Power, San Diego Gas & Electric Co., Central Arizona Light and Power Co.—these and many other big users have switched to inhibited oil. They have done so because tests in their own equipment proved: that inhibited oil will last many times longer than conventional oil, due to the improvement in oxidation resistance; that inhibited oil helps to prolong the life of the equipment itself because it guards against deterioration of insulating fabrics and other materials; *that transformer maintenance costs are much lower due to the all-around superiority of inhibited oil.*

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- **On its record to date, service life estimated at up to 50 years**
- **All-around superiority proved by experience of leading power companies**
- **Suitable for voltage regulators, circuit breakers, and oil-filled bushings and switches**

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THIS MONTH'S NEWS

Feather River Project Gets Authorization

The billion dollar Feather River water conservation and power development project in California gained the support of the state legislature a month after it was declared feasible in a report by State Engineer A. D. Edmonston.

The legislature passed a bill to authorize the California Water Project Authority to issue revenue bonds, without a fixed limit, in paying the costs of any of the features given in the Edmonston report.

The project includes a dam on the Feather River near Oroville, power plant facilities at the dam and afterbay sites, a power transmission line 150 miles long to Bethany in the Sacramento-San Joaquin delta; a standby steam plant and a system of canals to divert water into the San Francisco Bay region, coast counties and southern California.

The revenue bond powers given the water project authority are the same as those exercised by the state toll bridge authority in the construction of the San Francisco - Oakland Bay Bridge.

The Feather River bill offered no funds for detailed studies and construction plans but money is expected to be made available to the state division of water resources for the engineering work.

The Feather River development is a part of the state water plan and its construction by the federal government has been considered. However, it never was authorized by Congress for construction by the Bureau of Reclamation or Army Engineers.

Attempts to have the bill amended to exclude all portions of the project except the Oroville Dam, power plant and afterbay dam and power plant were defeated.

Festivals Dedicate Tracy Pumping Plant

Water festivals celebrating completion of Tracy pumping plant and full operation of initial features of the Central Valley Reclamation project were held Aug. 1 to 10 in northern and central California communities. The festivals were sponsored by the Bureau of Reclamation.

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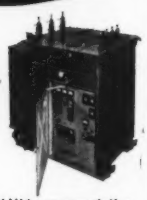

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CONTROLS . . . A Two-Edged Sword

It may seem dangerously premature to talk about getting rid of emergency government controls while all-out war is still an imminent possibility.

But success in this strange struggle for our freedom into which the Russian Communists have plunged us requires that we:

1. Maintain a whole battery of controls designed to speed defense production and curb inflation, and at the same time

2. Work to end the controls at the earliest possible moment.

Here is the reason why this editorial—fourth in a special series on mobilization for defense—is devoted to the need for a speedy release from controls.

If the Russian Communists can force us to maintain indefinitely the present system of government controls, they will have won a tremendous victory. They will have saddled us with a system of collectivism which, over a period of years, would be fairly certain death to freedom of business enterprise.

Make no mistake about it. This is not an argument against emergency controls. We need controls now to break a right of way for our mobilization program through the business boom. Indeed, the third editorial in this special series was titled "Why Controls Are Necessary." It stressed both the need for controls and the need for positive cooperation to make them work.

Controls Can Undermine Our Economy

But these controls surely chisel at the foundation of our normal economic system. So long as we have them, many if not most key business decisions will be made in Washington bureaus rather than in the free market place. For example, the *National Production Authority* administers a *Controlled* Materials Plan (italics ours) which directs the flow of basic metals, and decides who can use them for what purposes.

Happily, the people who operate these controls are not using the methods of a secret police state.

Even more happily, most of the leaders who have been drafted to manage the controls are not in love with their jobs. They are doing their best in the thankless task of making controls work. They recognize the danger of chronic controls.

But the fact remains that our economy is

operating under arrangements which carry it a long way toward the pattern of centralized control the Russians would inflict on the world.

The Wilson Plan

A plan for getting rid of these controls has already been developed. It was put together by our Director of Mobilization, Charles E. Wilson—while he was working day and night to set up the necessary emergency controls.

The Wilson Plan—if we escape all-out war—will strengthen our defenses and our economy. By 1953, it calls for:

1. Providing the weapons to equip an armed force of 3½ to 4 million, together with a supply of weapons for our allies.

2. Building a stockpile of weapons which, with current production, would be sufficient to carry on an all-out war for a year.

3. Building the manufacturing capacity by which we could rapidly expand our production of weapons if all-out war should come.

4. Increasing the productive capacity of industry enough to resume the expansion of our civilian economy.

With these jobs done our economy would be big enough and strong enough to meet both civilian and military requirements. And the government controls needed for mobilization could be speedily dropped.

Call for Sacrifice

The Wilson Plan requires a major effort—it means spending more than $50 billion a year for mobilization. That is almost 20 percent of our total production. And this cannot be done without sacrifice. For a time, particularly in the next year, living standards will drop.

But the sacrifice required is amazingly small. At the peak of the defense effort, civilians will still have available to meet their needs about as much as they did in any year before 1948.

To make the Wilson Plan succeed we must curb inflation. A second year of inflation such as that which we have had since the Korean war started would multiply disastrously the costs of our defense program. One key part of a successful program to curb inflationary pressure, which soon will be building up again, is a pay-as-we-go tax program. The second editorial in this series urged that we do our utmost to pay as we go.

We Cannot Out-Control the Communists

But, above all, to make the Wilson Plan work we must keep our sights set on the crucial importance of increased production. Our problem is to increase our capacity to produce so that we can carry both a major military program and an expanding civilian economy for as many years—General Bradley thinks it might be fifteen or twenty—as the menace of Russian Communist aggression persists.

If we do not produce enough to do this double job, we shall be confronted with the prospect of having to live indefinitely under government controls of the sort that have been set up since the start of the Korean war. That would be delightful to the Russian Communists. It would go far toward making over our economy on the Moscow model.

Even if we wanted to, we never could hope to out-control the Russians. They are miles ahead of us in that line. But we can out-produce them, by a tremendous margin. By doing that we shall travel the surest road to victory.

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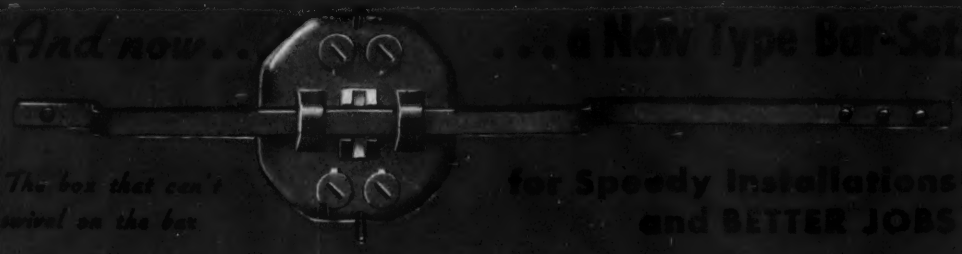
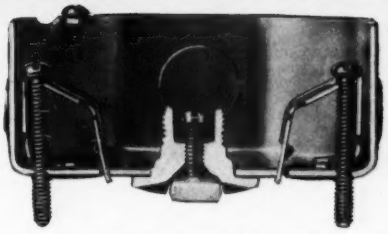
And now . . . . . a New Type Bar-Set



The box that can't swivel on the bar

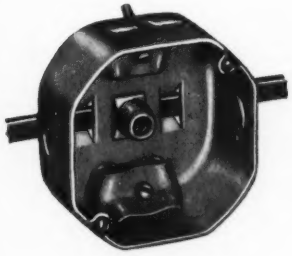
for Speedy Installations and BETTER JOBS

The bar fits snugly under the straps formed in the bottom of the box. These straps not only hold the box to the bar but prevent it from swiveling. When the box is properly positioned, a slight turn of the screw in the stud holds it firmly. This is the only purpose of the screw.



THE BOX IS MOVED TO THE PROPER POSITION

A SLIGHT TURN OF THE SCREW HOLDS IT THERE

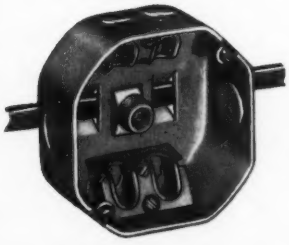


The NSB For Non-Metallic Sheathed Cable

14-2, 14-3, 12-2 and 12-3

Entry of Non-Metallic Sheathed Cable is quickly made through either side or bottom of box.

Cable is held firmly by this heavy-guage, smoothly-rounded clamp without the slightest injury to the insulation.



The ASB For Armored Cable

14-2, 14-3, 12-2 and 12-3

Ample openings, smoothly bushed to prevent injury to the insulation, permit free and easy entry of Armored Cable through either bottom or side of box, without backing out the screw. The clamp holds the cable firmly.

Screws in both "N" and "A" clamps are staked to prevent vibrating out of the box in transit.

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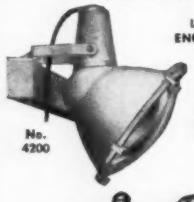

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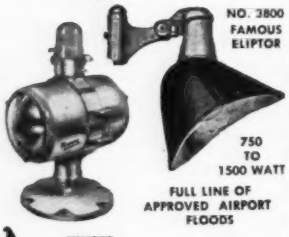

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ARTIFICIAL RAINMAKING LICENSED IN CALIFORNIA

California's first artificial rainmaking regulation and licensing law was passed by the legislature and signed by Governor Earl Warren July 24.

The governor also signed a bill appropriating $50,000 for research in the production and control of rainfall by artificial means. This latter bill authorizes the state water resources board to contract with public and private organizations and persons for the expenditure of the research funds.

The regulation of artificial rainmaking activities will be done by the state engineer. The license fee will be $50.Those given licenses will be required to keep records of their operations and file a report with the state engineer immediately upon completion of each operation.

The law sets up a procedure of public notice in the county where the work is to be carried on. Weekly notices for three consecutive weeks will be required in a newspaper having general circulation in the county. The law gives the state engineer the power to grant an emergency nucleation project permit without notice if he feels it will aid in extinguishing fires.

After hearing, the engineer has the right to revoke or suspend licenses if the licensees failed or refused to comply with the regulations. The law also carries a criminal penalty, a maximum of $500 in fines or six months in jail, or both.

Southern Colorado Power Will Build Power Line

D. B. Hyer Jr., executive vice-president of the Southern Colorado Power Co., has announced that construction of a 115,000-v power line between Pueblo and Colorado Springs will start immediately. Since preliminaries are disposed of, there appears no obstacle to early completion of the project. Total cost is estimated at about $500,000.

The transmission line will follow the shortest distance—45 miles—between the two cities and permit exchange of electrical energy up to 20,000 kw. Generating facilities of both communities are heavily overburdened, Hyer pointed out, because of rapid population expansion, and the new system will permit use of electricity to meet peak loads, which will vary between the two municipalities.

Southern Colorado Power also is depending on its new Rocky Ford plant and the units at Canon City and Skaguay, as well as interchange with the Colorado Fuel and Iron Co.'s power plant at Pueblo, to maintain adequate service in Pueblo. The over-all program will improve service availability in El Paso, Teller, Fremont, Custer, Pueblo and Crowley counties, all served by Southern Colorado Power Co.

Various phases of the project have been cleared by (1) the Colorado Springs city council, (2) directors of the Southern Colorado Power Co., (3) state public utilities commission, (4) defense electric power administration in Washington, which has issued the necessary construction priorities.

Utility Files For Rate Increase

Pacific Gas and Electric Co. has filed application with the California Public Utilities Commission for a $37,650,000 system-wide increase in electric rates. The company states that the increase is necessary for a minimum return on investment in order to attract new capital needed for expansion, now proceeding at the rate of more than $100,000,000 a year.

About one-half the requested increase will be added to net earnings, the balance going for taxes, PG and E estimates. With added earnings, returns on the $1.2 billion electric system will be 5.8%. At present electric rates, return would be 4.37% in 1952, which the company states is below the level needed to attract capital.

The rate increase will result in advances ranging from 15 to 21.6% in various consumer classifications with an average throughout the system of 18½%.

With the exception of a rise of 6% in February 1950, which reversed the reduction made in 1946, the company's electric rates have been reduced steadily since 1923, it was pointed out. Although present electric rates are generally no higher than in 1940, the company's operating costs have increased steadily and are still climbing. Wage rates and cost of equipment are nearly double the 1940 level. Fuel costs have risen sharply and taxes are approaching an all-time high.

● **Formal approval** of an 8% utility rate increase was given Arizona Edison late in July by the Arizona Corporation Commission. The action affirmed an order last June 2

ASSOCIATION EXPANSION PROGRAM MAY BE DELAYED

The Southern Colorado Power Assn., La Junta, predicts its plans to complete its $3,000,000 program in the Arkansas Valley may be delayed five years.

W. L. Austin, manager of the REA unit, reports that only 16% of the necessary aluminum has been allocated to the association for 1951; that copper wiring is 66% under current requirements.

Austin and directors of the SEPA have sent a strong protest to Colorado's congressional delegation in Washington. They said they "would not complain if industry generally were cut down to one-fifth of requirements in the interests of the defense effort, but there has been no such cut in many civilian uses of aluminum."

The association's expansion program is designed to serve 2,000 additional farms in southern Colorado. It has already been started and was to have been completed this year.

PG and E Steam Plant Goes on Line

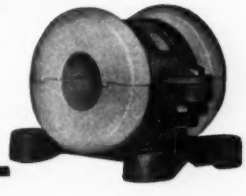
Pacific Gas and Electric Co.'s $80 million Contra Costa steam plant went on the line late last month when three 100,000-kw turbogenerators started operation. This is the ninth plant built by PG and E since the war and raises total power added since 1945 to about 1,374,500 kw.

Rates Reduced by Sacramento MUD

A 5½% rate reduction for residential, commercial and industrial customers of the Sacramento MUD will go into effect Aug. 28. The reduction will total approximately $482,600 annually. The district will put into effect bimonthly billing, which it estimates will save between $70,000 and $80,000 a year.

● All offices of the Bonneville Power Administration will be housed in a new eight-story building to be built in Portland by the Lloyd Corp. The $3 million building will occupy an area of 50x360 ft and will have 270,000 ft of floor space, all to be devoted to Bonneville departments. Adjoining the main building will be a two story structure to house BPA technical laboratories. The four buildings now occupied by BPA will be used for other federal agencies.

BE PREPARED FOR POSSIBLE SHORTAGES



Is your power wiring program liable to be hampered by shortages of critical materials, required to conceal it?

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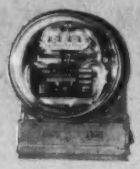
Single Phase Bottom-Connected Meters

Polyphase Detachable Meters



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Combination Polyphase and Thermal Watt Demand Meters

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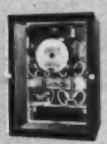

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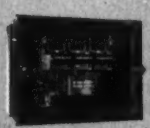

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POWER SHORTAGE DENIED IN ROCKY MOUNTAIN AREA

Indignant denial of present or predictable power shortage in the Rocky Mountain region was made by private industry leaders in response to a government official's charge that electric energy is not adequate to supply foreseeable demands.

H. F. McPhail, chief of the U. S. Bureau of Reclamation's power utilization branch in Washington, asserted that lack of generating and distribution facilities holds back industrialization in the area. Ralph L. Hubbard, manager of the Rocky Mountain Electrical League, speaking for 23 private utilities, and Carl E. Berg, industrial development manager for the Denver Chamber of Commerce, answered with facts and figures tending to prove the USBR spokesman is wrong.

Said Berg: "Electric power facilities haven't prevented any industrial concerns from locating in this area." Said Hubbard: "It's not likely the government would have planned its Rocky Flats atomic energy plant and Bureau of Standards laboratory at Boulder (35 miles from Denver) if adequate power had been lacking."

Hubbard took the occasion to compare government costs and those of private industry in establishing power bases. He cited Public Service Co. of Colorado's Arapahoe steam plant (bordering Denver county on the south) installed for less than $24 million to generate 120,000 kw, with the USBR's Big Thompson hydroelectric installations which will cost $100 million in tax money for the same approximate electrical output.

Hubbard also recalled that the electric shortage threat was posed by government experts during World War II. Despite the Rocky Mountain region's being converted to manufacture huge arms, ordnance and naval supplies, the portended shortage never developed. On the contrary, several hundred new industrial and manufacturing enterprises developed, all of them amply serviced by electricity.

Some 215,000 kw have been added to private power facilities in Colorado alone since 1945; and another 76,500 kw are planned by 1953.

McPhail had declared that a "steady stream of industrialists" through his Washington office inquire about electric power available for their projects, and that they do not select Colorado and Wyoming sites because energy is not sufficient for their purposes. That started the denials. There was suspicion in the area that McPhail's assertion was designed as groundwork for a proposal that new federal power generating programs be instituted to safeguard against electrical shortages beyond the ability of private enterprise to avert.

Curtailment Will Not Affect Southern California

Southern California Edison Co. and Los Angeles Department of Water & Power have assured their consumers that curtailment of power output from Hoover Dam will not have an appreciable effect on southern California's power supply.

The Bureau of Reclamation forecast a sharp drop in power output from Hoover Dam because of decreasing water runoff. The level of Lake Mead was the lowest this spring since 1947. E. A. Moritz, regional director of the bureau, predicted that the dam schedule will be about the same as during the 1946-47 period when generation was 4,258,777,621 kwh. This would be a reduction in power from last year of 162,232,705 kwh.

Both Southern California Edison and the Los Angeles Department expects to make up any shortage of supply from the dam with their steam plants. In the past year, Los Angeles received 71% of its power from Hoover Dam. The city-owned utility operates two steam plants at Los Angeles Harbor and Seal Beach and will soon start construction of a new steam plant in the San Fernando Valley with 320,000 kw as the ultimate capacity.

Southern California Edison Co., in addition to the six Hoover Dam generators it operates, obtains power from its Big Creek hydro project in the high Sierra, other smaller hydro plants, three steam plants at Long Beach, one at Redondo Beach and a diesel plant at Vernon. Edison is now constructing a steam plant at Etiwanda, and will complete this year a sixth power house in Big Creek.

Utility Entitled to Tax Refund, Court Says

Puget Sound Power & Light Co. is entitled to a refund on more than $50,000 in taxes it paid under protest in 1948 to five southwestern counties, the state supreme court has ruled. The company sold its properties in Mason, Lewis, Cowlitz, Pacific and Grays Harbor counties between May 21 and Sept 29, 1948. The tax levies were not made until October of last year.

BPA REPORTED STUDYING STEAM GENERATION

Reports from Washington last month stated that "serious consideration"is being given to drawing up a bill that would permit Bonneville Power Administration to construct three steam plants on the fringes of its present power distribution system as a short-term answer to the need for power in the Pacific Northwest.

One reason given was the success of fishing interests in blocking proposed hydro developments in the Cowlitz and Deschutes Rivers. A contributing factor is the slow down that Congress is imposing on larger hydro projects, it was pointed out in the report.

As a short-term alternative to hydro, BPA is said to be considering steam plants in the vicinity of Coos Bay, Ore., and Longview and Bremerton, Wash. They would be located to help out on the system fringes where line losses are heaviest. It is figured that credits against the steam costs would run from one-half to one mill because of the present line losses and transmission system costs.

The phrasing of the authorizing bill is not to the point of naming a specific government agency as construction administrator, but actual construction would be by private firms. The plants probably would be 100,000 kw each, with a unit cost of about $15 million.

Detroit Dam Bids Exceed Government Estimates

Bids on two phases of Detroit Dam project exceeded the allowable 25% over government estimate. There were ony two bidders.

Consolidated Builders Inc. bid $7,397,547 for construction of Big Cliff Dam, a reregulating dam located three miles downstream from Detroit Dam, and for completion of the Detroit power house. This bid was some $119,500 more than the allowable 25% over government estimate of $5,822,197.

Guy F. Atkinson Co. and Ostrander Construction Co., Portland, bid $8,912,885 for the entire job and also entered a bid of $6,541,996 for Big Cliff Dam on which the government estimated $4,430,943.

Consolidated Builders holds the general contract for Detroit Dam, which is well under way. Whether a new call for bids will be issued or the job completed through negotiation had not been announced late last month.

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DENVER CELEBRATES HIGHWAY LIGHTING

First step in the super-illumination of Denver's portion of the Valley Highway—a traffic artery channeling automobile travel through and beyond congested city areas—was celebrated recently when 2¼ miles of the road were dedicated.

Mayor Quigg Newton and President John E. Loiseau of Public Service Co. of Colorado participated in the ceremonies that touched off the inaugural lighting of 289 mercury vapor lamps. As a special feature, General Electric's 50,000-w incandescent lamp was lighted simultaneously and kept burning for half an hour.

That portion of the Valley Highway illuminated for the first time extended from West 38th Ave. and Fox St. to the northern city limits, marking the section of completed roadbed that eventually will thrust 12 uninterrupted miles through Denver's streets.

The lamps are mounted on 30-ft standards and require a 10-minute warm-up period. Each lamp produces light equivalent to 180,000 candles, Mayor Newton explained to the thousands of spectators. When finished, the lighting project will have 1,500 of the mercury vapor units.

Other dignitaries present at the dedication were: Robert McIllvaine, past president of the Denver Chamber of Commerce, who helped plan the Valley Highway; Averill C. Johnson, who represented Governor Dan Thornton; C. E. Shumate, assistant chief engineer of the state highway department; Russell W. James, urban engineer of the U. S. Bureau of Public Roads; C. E. Woodworth of Public Service Co. of Colorado, and Henry Barnes, Denver's chief traffic engineer.

Denver now has 45 miles of streets illuminated by mercury vapor lamps and by the end of 1951, 5,000 such units will have been installed.

All wiring for the Valley Highway lighting is underground.

PUD Granted Loan for Box Canyon Dam Studies

Pend Oreille PUD of Newport, Wash., has received a $50,000 loan from the federal government's Community Facilities Service to aid in preparation of plans for a proposed dam across the Pend Oreille River in Box Canyon. The dam is estimated to cost at least $15 million.

The PUD originally had asked $125,000, previously had received $31,250. The Harza Engineering Co. of Chicago is acting as consultant for the PUD on the project.

● **A 5% pay** increase for 9,419 employees of the Los Angeles Department of Water & Power was criticized by the city council on grounds that other city employees will demand like increases. The department operates independently on its own water and power sales revenues and it was charged that it was paying higher wages than other city divisions before the recent increase. Samuel B. Morris, general manager and chief engineer, said the increased cost of living and wage increases granted by private industry had made the higher pay necessary.

● **Southern California Edison Co.** has asked FPC for a license for a hydro project on Mono Creek in Fresno County, Calif. The proposed development would include a dam, about 160 ft high and 4,350 ft long, forming a reservoir with a gross capacity of approximately 125,000 acre-ft. Estimated cost is almost $8½ million.

● **Northern Arizona Light & Power Co.**, a subsidiary of Central Arizona Light & Power, has purchased electric systems at Jerome and Clarksdale, Ariz. The two communities, which add 900 customers, will become part of the company's Verde district.

● **FPC** has issued Pacific Gas and Electric Co. a 50-year license for the Utica hydroelectric development in central California. The plant was formerly operated under the name of Utica Power Co. and was purchased by PG and E in November 1946, effective date of the license.

● **Pacific Power & Light Co.** has applied to FPC for authorization to issue 250,000 shares of no-par-value common stock. Common stockholders would be offered rights to subscribe and unsubscribed shares would be purchased by a group of underwriters.

● **Puget Sound Power & Light Co.** completed negotiations for sale of property on Olive Way for $130,000 and for eventual sale of the Electric Bldg. for $370,000. The buyer has agreed to acquire the building within five years at a time selected by the company. If the company decides to keep the building longer than five years, the purchaser may cancel the contract, if he desires.

NEWS ABOUT PEOPLE

● **Douglas J. Donohue,** for 21 years with the Trumbull Electric Mfg. Co. in the Pacific Northwest, has been named Atlantic district sales manager for the Trumbull Department of the General Electric Co., with headquarters in Philadelphia. Donohue was employed by the AG Mfg. Co., when it was taken over by Trumbull in 1930. For many years, he was estimator and later chief engineer in the Seattle works. Joining the marketing department of the company in 1946, he was named sales representative in the Northwest district, the position he held at the time of his transfer. Donohue was a member of the Electric Club of Washington and the Engineers Club of Seattle.

● **Walter T. Baker Jr.** has been appointed Pacific Coast district manager for the Westinghouse Electric Appliance Division, San Francisco, succeeding **J. J. Moffatt.** Baker has been northwestern district appliance manager, headquartered at Chicago. He joined the Westinghouse appliance division in 1934 and one year later was assigned to the eastern district. After four years of service in World War II with Navy patrol squadrons in Caribbean waters, he returned to Westinghouse in 1945 as eastern district sales promotion manager. In April 1948 he was named northwestern district appliance manager.

● **Two promotions** have been announced by Pacific Power & Light Co. **Roy Vernstrom** has been advanced from advertising manager to executive assistant to Paul B. McKee, president, and D. R. McClung, vice-president. **R. K. "Jack" Foley,** former assistant advertising manager and publicity supervisor, has been named advertising manager.

● **Charles Harshberger,** with Square D Co. at Seattle for more than two years, replaces **Paul F. Burke** in the order department. Burke has joined the Morgan Electric Co. and will go to Fort Richardson, Alaska, where the company is building a power plant.

● **Lloyd Smith,** business manager and financial secretary of Local 77, IBEW, was re-elected recently. Also re-elected were **H. S. Silvenale,** president, and **Floyd Miles,** treasurer.

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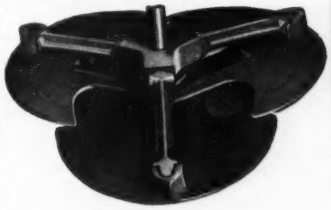

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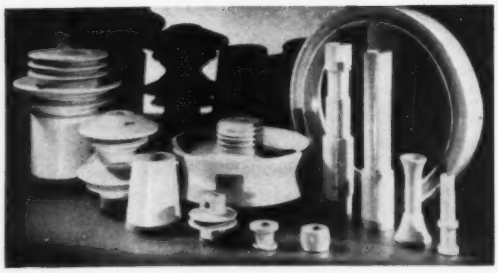

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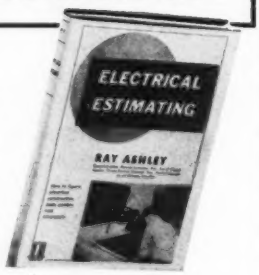

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● **Albert Ames,** City Light industrial sales engineer at Seattle, retired on July 1 after 34 years with the department. He started with the city in 1913 as an electrical inspector when that division was part of the fire department and continued in that position when electrical inspection was transferred to the building department. Ames transferred to City Light in 1917 as an outside salesman, becoming senior contract agent in 1934, and industrial sales engineer in 1943. In the latter position, he did considerable research on electric space heating, water heating, and other electrical utilization problems.

● **Claire Titus** has been appointed manager of Central Arizona Light and Power Co.'s commercial and industrial sales section. He succeeds **C. T. Yates** who resigned after 24 years with the company to become engineer for the Arizona Electric Coordinating Committee. Titus joined Calapco in January with 13 years' experience in the utility field. He has worked in the Canal Zone, Philippines, Guam, and Pearl Harbor and was instructor in electrical engineering at College of the Pacific and the University of California.

● **Leonard G. Walker,** former Idaho Power Co. electrical engineer, has accepted a position with Motorola Inc., Chicago. He had been with Idaho Power for more than 14 years. His assignment with Motorola is as assistant chief engineer in the communication and electronics division. His job includes commercial application of research in power line carrier and supervisory control equipment. While with Idaho Power, he developed unittrol, a new approach to automatic substation control, and directed other innovations.

● **Russell E. Potter,** former city engineer of New Westminster and Nelson, B. C., has been named a member of the three-man British Columbia Public Utilities Commission. He will occupy the position vacated when **L. W. Patmore** resigned. **Dr. W A.. Carrothers** is chairman of the commission and **D. K. Penford** is the third member.

● **Gustaf Ostlind,** formerly an electrical engineer with the Royal Board of Waterfal, Sweden, has joined the engineering staff of Pacific Power & Light Co. His work in Sweden was estimating and forecasting power consumption. He also was an electrical inspector for the Royal Board of Trade.

Kramer

● **Elbert Kramer,** formerly appliance sales promotion manager for Westinghouse Electric Supply Co. at Los Angeles, has been named to the newly created post of radio and television sales promotion manager for WESCO's southern California district. His headquarters will be at the Vernon branch. Kramer joined Westinghouse Electric Corp. as a graduate student at East Pittsburgh in 1912, and three years later was transferred to San Francisco in the appliance division. In 1947 he was transferred to the Los Angeles office of the supply company as an appliance training specialist.

● **Earl A. Slater** retired recently as assistant to the Pacific Coast district manager of the Westinghouse engineering and service department. Slater joined Westinghouse in 1920, was transferred to San Francisco in 1926. More than 100 attended a dinner in his honor at the San Francisco Engineers Club on July 11.

● **H. S. Christensen,** formerly supervisor of underground for Southern California Edison Co., has joined E. A. Irish, contractor, as superintendent of underground construction.

● **Robert H. Maddan** Jr. has been appointed division vice-president in charge of Columbia Steel Co.'s central sales division. Headquarters are in San Francisco.

● **William I. Morgan,** general engineer, who has been at Grand Coulee Dam since April 1938, retired from the USBR recently.

● **A. J. Shaver,** for the past seven years resident engineer of the Colorado River Commission, has been named chief engineer and operating manager for the commission. His offices have been moved from Los Vegas to Henderson, Nev. In his new position, Shaver will head up the power operations of the Basic Magnesium project owned by Nevada. Under firm contracts with lessees at the Basic project, the Colorado River Commission will supply between June 1951 and May 1952 about a half billion kilowatt-hours of the state's allocation of energy from Hoover and Davis plants. Before his employment by the commission, Shaver was with Sierra Pacific Power Co. in Reno and later was manager of the Western States Utilities in Winnemucca.

Deaths

● **William C. Johnson,** executive vice-president, Allis-Chalmers Mfg. Co., well known on the West Coast because of frequent visits, died suddenly in Milwaukee on July 26. He was 49 years old.

● **L. J. Nevraumont,** personnel manager of Pacific Gas and Electric Co., died suddenly following a heart attack on July 12. Starting with the company in 1915, mopping floors in a San Francisco substation, he served during his career as substation operator, local agent, commercial manager and then assistant manager at the Stockton division. He had directed the company's personnel department for ten years.

● **L. E. Johnson,** manager of the Dallas, Texas, office of Copperweld's Wire and Cable division, died on July 3. As Dallas manager, he had represented the company in New Mexico.

● **Roy Rees Robley,** 76, former assistant to the vice-president of Portland General Electric Co., died June 25. He was author of a publication on the company's history and in 1946 received an award in recognition of his services in supervising the company's participation in the Northwest power pool during World War II. He was a contributor to several technical journals in the electrical field.

● **J. J. Goodman** of Portland died July 7, aged 47. He had been chief clerk for the commercial department of Northwestern Electric Co., and in 1945 joined Gilbert Bros., electrical distributors. He was a past president of the Oregon Electric Club.

● **A. M. Welter,** partner in the electrical contracting firm of Malm & Welter, San Francisco, died in mid-July.

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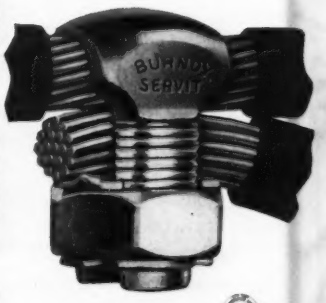

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NOTES ON THE TRADE

● **Establishment** of a new National Bureau of Standards laboratory center at Corona, Calif., to be devoted to various phases of electronic research, development and engineering was announced by Dr. E. U. Condon, director of the National Bureau of Standards. The new research center will be primarily concerned with technical problems of importance to the Department of Defense. The first NBS unit to be transferred to Corona will be the guided missiles laboratory. This site was transferred to NBS by the Department of the Navy because of the bureau's urgent need for new facilities. About 22 buildings are being renovated to accommodate NBS research and development activities being transferred there from Washington. Dr. R. D. Huntoon, formerly Chief of the NBS Atomic and Radiation Physics Division, has been named associate director to head the new laboratories.

● **Denver** was one of the stopping points in the recent tour of Wheelco Instrument Co. officials to district offices. A three-day show staged by eleven top executives told the company story to field representatives. The tour was led by **Fred Hansen,** president, and **Charles A. Saunders,** executive vice-president.

● **J. Korber** & Co., 200-224 N. 2nd St., Albuquerque, has been named distributor for the Apex Electrical Mfg. Co. in New Mexico.

● **Plans** to open a factory branch in San Diego were announced in July by Admiral Corp. W. C. **Johnson,** vice-president in charge of sales, said that the company had decided to open the branch to learn problems and requirements for television markets in remote areas.

● **Ampex Electric** Corp, makers of ultra high fidelity magnetic tape recorders, has a new plant under construction at Redwood City, Calif. The new plant will include special departments for telemetering and instrumentation development.

● **S & M Lamp** Co. of Los Angeles has appointed Gleasons Manufacturers' Representatives of Seattle to represent its Flood-Lite division in Washington, Oregon, Idaho, Montana and Alaska. **Donald S. Gleason** and **Frederick E. Gleason** head the Seattle firm.

● **A. A. Jones** and **I. Earl Russell** have purchased the business of the Vancouver Lighting Supply Co. Ltd., and will operate it as the Vancouver Lighting Co. They will specialize in custom-made lighting fixtures of all types. Jones has been manager of the company for the past three years, and Russell, shop foreman, has been associated with the firm for 37 years. He joined the company when it was operated as Farr, Robinson & Bird. Premises at 924 East Hastings St. occupied by the former company will be taken over by the new owners.

● **J. Radcliffe** has been named Western representative at Vancouver, B. C., for the Canadian Standards Assn. He will establish his offices at 1167 West Pender St. Since the inception of the Canadian Standards Assn. in British Columbia 32 years ago, it has been represented by **L. H. Miller.**

● **Globe Electric Co.,** Seattle electrical wholesaler, is now in new quarters at 215 2nd Ave., S. The company was forced to vacate quarters it had occupied for 22 years following a fire on Jan. 6. Globe is headed by **D. W. Chamberlin,** president, and **R. G. Reiniger,** secretary-treasurer.

● **H. J. Randolph Co.,** 650 S. Grand Ave., Los Angeles, has been appointed representative for T. J. Cope Inc. of Philadelphia, manufacturer of underground tools, cable pulling equipment and benders.

● **H. A. Bestall,** president of McLennan, McFeely & Prior Ltd., wholesale hardware, electrical, furniture and sports good dealer, with headquarters in Vancouver, B. C., has announced four new executive appointments. **N. H. Lyon** has been named manager of the company, in charge of all the British Columbia operations, with **G. E. Wray** as assistant manager and **J. W. Asher** as comptroller. **W. H. Jones** has been named merchandising manager.

● **T. O. Gerlishe,** electrical engineer, has opened a new office at 1441 Franklin St., Room 302, Oakland.

● **Walter L. Stickel,** manager, receiver sales division of Allen B. DuMont Laboratories, visited the West last month on a coast to coast survey of important television centers.

● **O. A. "Chick" Alderman,** for many years district manager of Bussmann Mfg. Co. in Seattle, has been named to a newly created position as division manager for the Western states for that company. He continues to make his headquarters in Seattle. He has given up handling the Toastmaster line. **William Moore** has been transferred from the Denver office to Seattle to represent the Toastmaster Products Division there.

● **Trumbull Electric Co.** (a department of General Electric Co.) opened a new San Francisco plant for the fabrication of switchboards and panel boards at 555 Minnesota St., having outgrown its former plant on Howard St. which originally was the Drendell Electric Co. An open house was held July 13 to show customers and friends of the company the new facilities and offices.

● **A. L. Dickson,** 2363 Greenfield, Los Angeles, has been appointed agent for California, Arizona and New Mexico for the Premax Products Division of Chisholm-Ryder Co., Niagara Falls, N. Y. He will handle the Premax metal markers for transmission and distribution poles and other utility structures.

● **Chester H. Lang,** General Electric vice-president, who addressed the PCEA Convention in June, has been named head of the company's public relations organization. Lang has been with G-E since 1919 and previously served as manager of marketing for the Apparatus department.

● **Larry Dodd,** with the National Electric Products Corp., Seattle, for the past 10 years, has been promoted to the position of district manager at Kansas City, Mo.

● **Norris-Thermador** Corp. will establish a plant at Riverbank, Calif., for manufacture of steel cartridge cases, under contract with Army Ordnance.

DIRECTORY ADDITIONS

Manufacturers' Directory

BUCKINGHAM MFG. CO., Binghamton, N. Y.—Chas. E. Morton Co., 1406 So. Grand, Los Angeles, and General Electric Supply Co., Albuquerque, N. M., have been added to list of distributors.

PREMAX PRODUCTS, Div. Chisholm-Ryder Co., Niagara Falls, N. Y.—represented by A. L. Dickson, 2363 Greenfield Ave., Los Angeles 25.

±10% Regulation... in Sixteen 1¼% Steps

with New URL-16 Voltage Regulator — An Important Addition to the URL-8 Line

ASSURES MORE REVENUE FROM HEAVILY LOADED RURAL AREAS

Here's a new, low-cost answer to economical regulation in rural or suburban areas . . . at the substation or on the line. This new regulator increases the "URL" line for application in locations where a 10% range is not sufficient, and where a ±10% regulator is required. Sixteen 1¼% step operation meets these requirements under any load condition, at minimum cost.

Check these moneysaving features:

10% Regulation, Raise and Lower, in 16 Steps of 1¼% Each—Combines light weight for single-pole mounting with regulation for substation application. A double-purpose feature that cuts costs. Regulator retains every outstanding "URL" feature.

Simple Tap Changer, with Reversing Switch for ±10% Regulation—Cuts maintenance. Assures positive arc interruption and minimum voltage variation during tap changing period.

Package Control Mounted in Improved Control Cabinet—Operating relays are mounted in flexitest chassis. Separate resistance and reactance line drop compensator provides rated line drop compensation with regulator carrying only 67% rated load. All mounted in a cabinet with door hinged to provide workbench when fully opened.

For Further Information, call your Westinghouse representative, or write. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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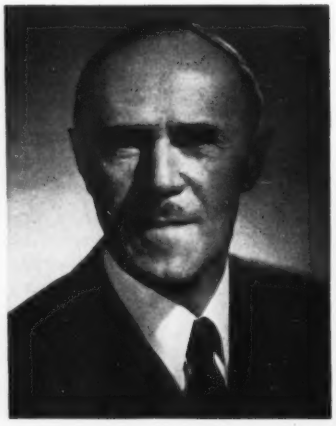
PROFILES

Norfleet Callicott Jr., right, Zenith division representative with Sues, Young & Brown, was winner of one of ten 1951 "Sammy" awards made to outstanding salesmen by the Los Angeles Sales Executive Club. Pictured here with Callicott is Charles P. Culbert, vice-president of Sues, Young & Brown. "Sammy" awards are annual ones

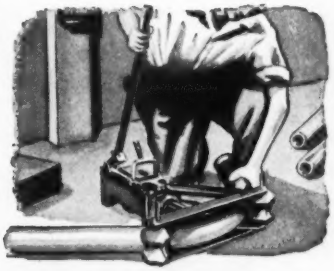
Eugene W. Garcia, right, retired manager of General Electric Supply Corp.'s Oakland branch, received a life membership in the East Bay Electric Club in appreciation of his 41 years of service to the industry and his leadership in the club. William Parks, left, PG and E division manager and president of the Oakland Chamber of Commerce, made the presentation. Looking on: Don Relfe, electrical engineer, Port of Oakland and president elect of the East Bay Electric Club; Walter Howell, past president of the club and sales manager of PG and E's East Bay division



Joe Wells, district claims manager for Westinghouse Electric Supply Co. at Seattle, has retired after 49 years in the electric industry. Wells began with Pacific Tel. & Tel. in Portland in 1902; joined Fobes Supply in Seattle in 1911. When WESCO took over Fobes in 1923, Wells became order clerk. He was advanced to purchasing agent and then to assistant manager. He later organized and managed the Tacoma branch and the Yakima branch. He also organized the district claims department, which he managed until his retirement. A charter member of the Electric Club of Washington, he has served as its secretary and treasurer

Walter T. Baker Jr. will succeed J. J. Moffatt as Pacific Coast district manager for the Westinghouse Electric Appliance division. Baker comes from Chicago where he has been northwestern district appliance manager. He joined the organization in 1934. He was assigned to the eastern district in 1935 and went to Chicago in 1948

"Hey Boss, we finished two hours early!"



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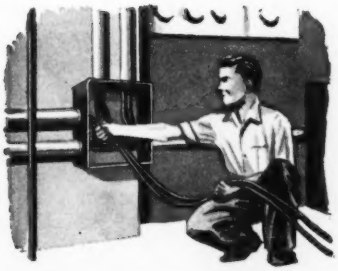

We used Triangle power cable and varnished cambric—lots of it! This big stuff is easy to handle and we saved plenty of time there. Every foot was right, nothing to reject.

On the branch circuits we used Triangle's Glazon. It's got a smooth finish and small outside diameter that makes it easy to pull, and it's free stripping.

That's about it, Boss. We can go over to that other job now—the one we didn't think we could tackle until tomorrow.

Yes-Sir, when it comes to quality wire, cable and conduit—Triangle *Must* Be Right! Why don't You specify Triangle on *Your* next job? Ask your jobber—he knows, It *Must* Be Right.

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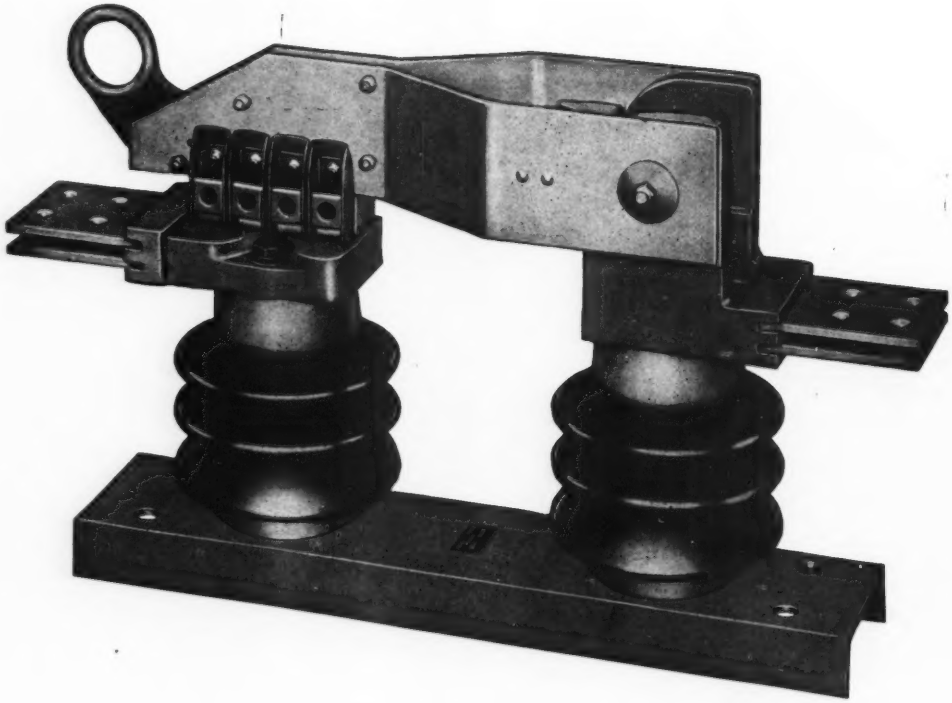

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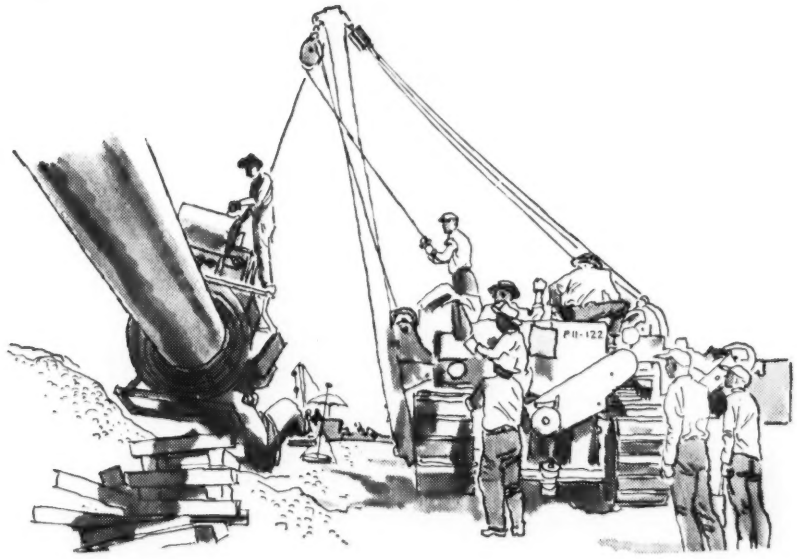

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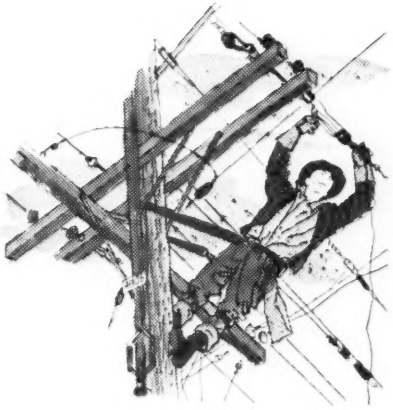

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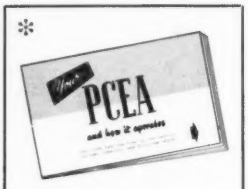

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